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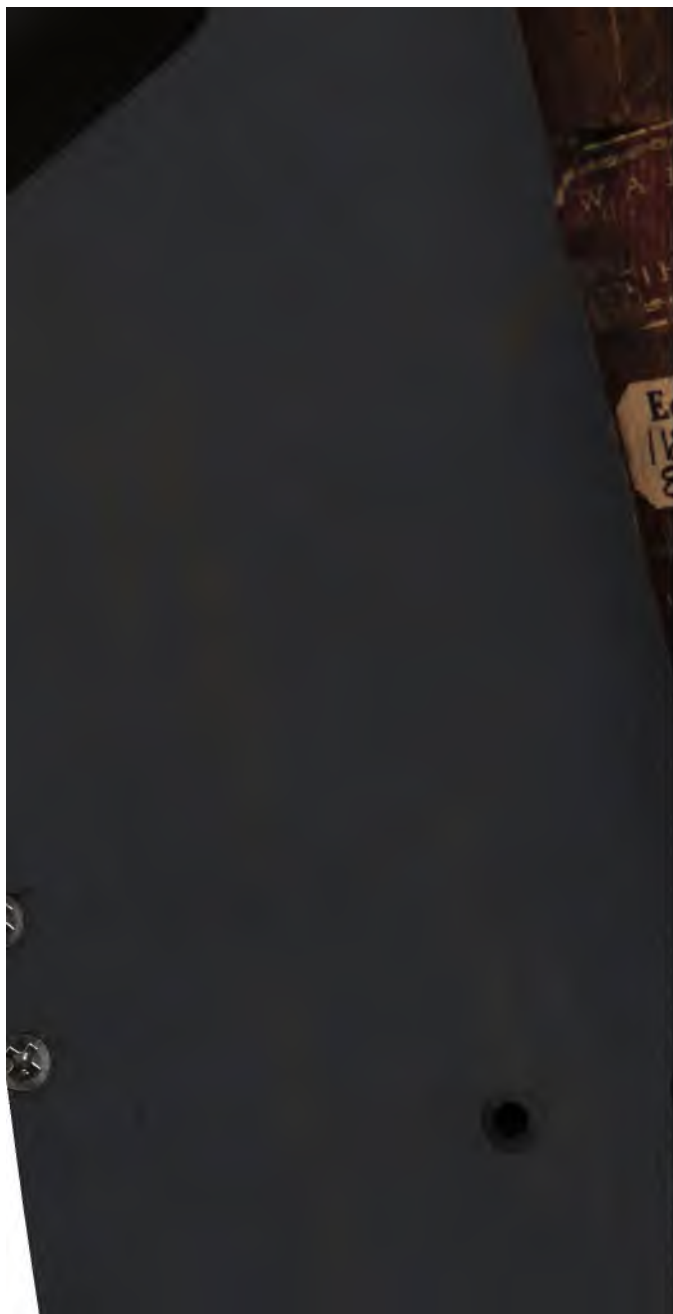
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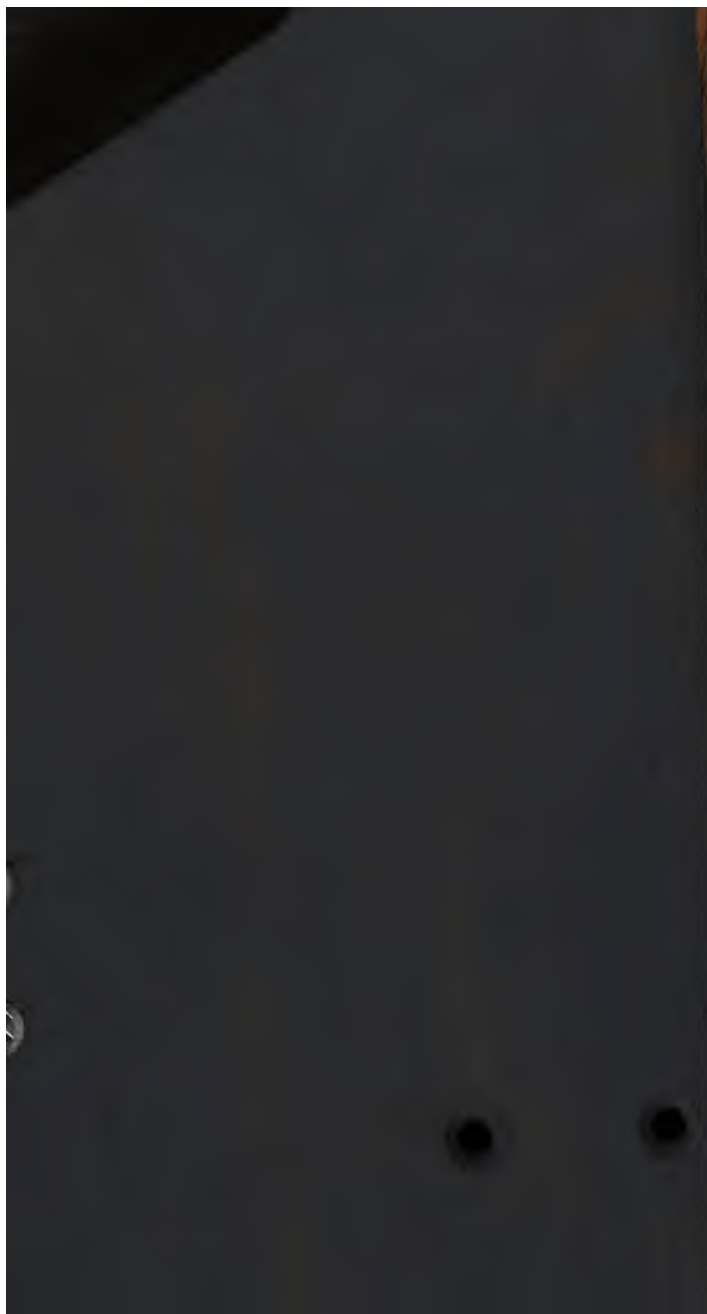


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Sam^l. Chamberlain*

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John Derby's Book, Salem
A NEW SYSTEM
OF
MERCANTILE ARITHMETIC;

ADAPTED TO THE
Commerce of the United States,
IN ITS
DOMESTIC AND FOREIGN RELATIONS;
WITH
FORMS OF ACCOUNTS, AND OTHER WRITINGS USUALLY
OCCURRING IN TRADE.

BY MICHAEL WALSH, A. M.

Iter est breve per exempla..... SENECA.
John Derby



THIRD EDITION.

NEWBURYPORT—PRINTED BY E. M. BLUNT, (Proprietor.)
For THOMAS CLARK, Portland.

1804.

✓
Edin T 118.04.87413.

John Derby - AD 1805. —

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BY

GEORGE ARTHUR PLIMPTON

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.. TO WIT :..

BE IT REMEMBERED, That on the seventeenth day of April, in the twenty-fourth year of the Independence of the United States of America, **MICHAEL WALSH**, of the said District, hath deposited in this Office, the title of a Book, the right whereof he claims as Author, in the words following, to wit :

‘ A NEW SYSTEM OF MERCANTILE ARITHMETIC : ADAPTED TO THE COMMERCE OF THE UNITED STATES, IN ITS DOMESTIC AND FOREIGN RELATIONS ; WITH FORMS OF ACCOUNTS, AND OTHER WRITINGS, USUALLY OCCURRING IN TRADE—BY MICHAEL WALSH.’

In conformity to the Act of the Congress of the United States, intituled “ An Act for the encouragement of learning, by securing the copies of Maps, Charts and Books, to the Authors and Proprietors of such Copies, during the times therein mentioned.”

N. GOODALE, Clerk of the District of Massachusetts District.

A true copy of record,

Attest—N. GOODALE, Clerk.

John W. Smith

Newburyport

RECOMMENDATIONS.

Newburyport, May 1, 1800.

WE the subscribers having seen Mr. WALSH's New System of MERCANTILE ARITHMETIC, and being satisfied, that it is better calculated, than any yet published, to fit a youth for the business of the Compting-House, cannot but wish it an extensive circulation. The happy elucidation and extended application of the common rules, together with the many original improvements, while they accomplish the student for commerce, are also extremely well adapted to assist and inform the merchant, the mariner, and the trader in their various occupations.

*Dudley A. Tyng,
Ebenezer Stocker,
William Bartlet,
Samuel A. Otis, jun.,
Tristram Coffin,*

*Moses Brown,
William Wyer, jun.,
Richard Bartlet, jun.,
William W. Prout,
Michael Little.*

.....

Boston, May 16th, 1800.

WE the subscribers, having examined Mr. WALSH's New System of MERCANTILE ARITHMETIC, and being persuaded that it is better calculated than any we have met with, to qualify young men for admission into Compting-Houses, we wish that it may have an extensive circulation. The clear exemplification and pertinent application of the common rules, together with the many useful additions and improvements which it contains, will render it extremely useful for the merchant, the mariner, and all the other trading classes of society.

*Murston Watson,
John C. Jones,
John Codman,
Stephen Higginson,*

*John Lowell, jun.,
Joseph Russell,
Arnold Welles, jun.,
Jonathan Jackson.*

Salem, October 7th, 1800.

WE the subscribers, Merchants of Salem, convinced of the necessity of rendering the forms of business, the value of coins, and the nature of commerce, more familiar to the United States as a commercial people, do approve of the **MERCANTILE ARITHMETIC** of Mr. WALSH, and recommend it as calculated to subserve in the best manner the instruction of our youth, and the purposes of a well-informed merchant.

*Wm. Gray, jun.
Benj. Hodges,
B. Pickman,
Nath. Bowditch,*


*Jacob Ashton,
Wm. Prescott,
Jacob Crowninshield,
Elias Hasket Derby.*

Preface to the third Edition.

THE merit of WALSH'S MERCANTILE ARITHMETIC having been submitted to the public, and established by the most liberal and unequivocal encouragement, the Editor feels a confidence in offering a third Edition of ten thousand copies.

It is unnecessary now to urge the superiority of this over every similar production extant. The discernment of men of letters, and the generous spirit of a commercial public have rendered panegyric useless by an unprecedented patronage. In the very short period of its existence two extensive impressions have been circulated through the country, and orders are already received for a very large proportion of the third.

The value of any work must be decided by those to whom it is more immediately useful; and if such persons possess the means of discrimination the decision will undoubtedly be correct. The present publication is adapted as well to assist the researches of Mathematicians, as to facilitate the negotiations of Merchants. Such characters have supported it by their written approbation, and recommended it by an introduction into their own Studies and Compting rooms. Schools and



PREFACE.

Academies have made it the basis of a mercantile education, and it has become an indispensable assistant to every trading class of the community.

This impression has received several valuable additions under the general head of Exchange, including the existing exchange with Antwerp, Trieste, Genoa, Venice, Barcelona, and Palermo in Sicily, and many useful rules under each of these particular heads. A new subject is likewise added, entitled "ARBITRATION OF EXCHANGE," the importance of which will easily be seen by Merchants whose remittances may travel through several countries, and be liable to the rates of Exchange in each.

The errors of the last edition were few and unimportant. But to render the work perfect, they have been minutely considered and corrected.

The Editor is confident that the present edition will be taken up with the same avidity as the two former, and he assures the public that the work shall not suffer, either in accuracy or beauty, by the liberality of its patrons.

EDMUND M. BLUNT.

SEPTEMBER, 1805.

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* *To find the value see page 69.*

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* This article ought to follow page 202, but was not received in season. It was handed by a gentleman whose information may be depended on, who arrived a few days previous to the publication of the present edition.

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EXPLANATION

OF THE CHARACTERS USED IN THIS WORK.

....

$=$ SIGNIFIES equality, or equal to : as, 20 shillings $=$ one pound : that is, 20 shillings are equal to 1 pound.

$+$ Signifies more, or Addition : as $6+6=12$, that is 6 added to 6 is equal to 12.

$-$ Signifies less, or Subtraction ; as, $6-2=4$, that is, 6 less 2 is equal to 4.

\times Signifies Multiplication ; as, $6 \times 2=12$; that is, 6 multiplied by 2 is equal to 12.

\div Signifies Division ; as $6 \div 2=3$; that is 6 divided by 2 is equal to 3.

Division is sometimes expressed by placing the numbers like a fraction, the upper figure being the dividend, and the lower the divisor : thus, $\frac{54}{6}=9$; that is, 54 divided by 6 is equal to 9.

$::$ Proportion ; as, $3 : 6 :: 9 : 18$; that is, as three is to 6, so is 9 to 18.

$\sqrt{}$ Prefixed to any number signifies that the square root of that number is required.

MERCANTILE ARITHMETIC.

ARITHMETIC is the art of computing by numbers, and has five principal rules for this purpose, viz. *Numeration, Addition, Subtraction, Multiplication, and Division.*

NUMERATION

Teacheth to express any proposed number by these ten characters, 0. 1. 2. 3. 4. 5. 6. 7. 8. 9.—0 is called a cypher, and the rest figures or digits. The relative value of which depends upon the place they stand in, when joined together, beginning at the right hand as in the following

TABLE.

6	5	4	3	2	1
hundreds of millions.	tens of millions.	millions.	hundreds of thousands.	tens of thousands.	thousands.
			hundreds.	tens.	units.

Though the table consists of only nine places, yet it may be extended to more places at pleasure; as, after hundreds of millions, read thousands of millions, ten thousands of millions, hundred thousands of millions, then millions of millions, &c.

TO WRITE NUMBERS.

RULE. Write down the figures as their values are expressed, and supply any deficiency in the order with cyphers.

SIMPLE ADDITION.

EXAMPLES.

Write down in proper figures the following numbers.

Twenty-nine,

Two hundred and forty-seven,

Seven thousand nine hundred and one,

Eighty-four thousand three hundred and twenty-nine,

Nine hundred and two thousand six hundred and fifteen,

Eighty-nine millions and ninety,

Four millions four hundred thousand and forty,

Nine hundred and nine millions nine hundred and ninety,

Seventy millions seventy thousand and seventy.

Eleven thousand eleven hundred and eleven.

eleven thousand...11000

eleven hundred....1100

eleven 11

Fourteen thousand fourteen hundred and fourteen.

fourteen thousand...14000

fourteen hundred .. 1400

fourteen 14

Total...12111

Total...15414

To express in words any number proposed in figures.

RULE. To the simple value of each figure, join the name of its place, beginning at the left hand and reading towards the right.

EXAMPLES.

Write down in words the following numbers.

46, 199, 2267, 86693, 289732, 11911911, .
1169990, 9919, 4320, 55000510.

.....

SIMPLE ADDITION

Teacheth to collect numbers of the same denomination into one sum.

EXAMPLES.

Gallons.

68965

14753

29684

57693

171095

171095

Yards.

59473

8914

675

29

Bushels.

875496

170900

574

9

SIMPLE SUBTRACTION.

13

Gallons.	Yards.	Bushels.
17573	180041	750010
468	4095	31994
57	83	573
9	7326	74857
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>
<hr/>	<hr/>	<hr/>

As the mercantile method of proving addition is to reckon downwards, as well as upwards, the sums of which will be equal, when the addition is just, two spaces are left for the work.

.....

SIMPLE SUBTRACTION

Teacheth to take a less number from a greater of the same denomination, and thereby to shew the difference.

EXAMPLES.

	Yards.		Gallons.
From	57468532	From	29689141
Take	26587491	Take	17938762
	<hr/>		<hr/>
Rem.	30881041	Rem.	11750379
	<hr/>		<hr/>
Proof	57468532	Proof	29689141
	<hr/>		<hr/>

3 from	924357	take	565383	Rem.	358974
4	517684		291872		225812
5	510090		191939		318151
6	191191		2957		188234
7	291619		829		290790
8	500910		15723		485187

.....

SIMPLE MULTIPLICATION

Is a compendious way of adding numbers of the same name.
 The number to be multiplied is called the multiplicand.
 The number which multiplies is called the multiplier.
 The number arising from the operation is called the product.

SIMPLE MULTIPLICATION.

MULTIPLICATION TABLE.

1	2	3	4	5	6	7	8	9	10	11	12
2	4	6	8	10	12	14	16	18	20	22	24
3	6	9	12	15	18	21	24	27	30	33	36
4	8	12	16	20	24	28	32	36	40	44	48
5	10	15	20	25	30	35	40	45	50	55	60
6	12	18	24	30	36	42	48	54	60	66	72
7	14	21	28	35	42	49	56	63	70	77	84
8	16	24	32	40	48	56	64	72	80	88	96
9	18	27	36	45	54	63	72	81	90	99	108
10	20	30	40	50	60	70	80	90	100	110	120
11	22	33	44	55	66	77	88	99	110	121	132
12	24	36	48	60	72	84	96	108	120	132	144

EXAMPLES.

Multiplicand	5965468	4765293	6281947
Multiplier	2	3	4
Product	<u>11930936</u>	<u>14295879</u>	<u>25127788</u>

4 Mult.	2658758	by 5	product	13293790
5	9674372	6		58046232
6	7689657	7		53827599
7	2674876	9		24073884
8	4198543	10		41985430
9	7491685	11		82408535
10	2689489	12		32273868
11	1768735	20		35374700
12	2891496	400		1156598400
13	5749857	78		44848846
14	2653294	872		2313672368
15	78965987	5893		465346561391
16	562916859	490070		275868665090130

.....

SIMPLE DIVISION

Teacheth to find how often one number is contained in another of the same name.

The number given to be divided, is called the dividend.

The number by which to divide, is called the divisor.

SIMPLE DIVISION.

17

The number of times the *divisor* is contained in the *dividend*, is called the *quotient*.

The *remainder*, if there be any, will be less than the *divisor*.

PROOF.

Multiply the quotient by the divisor ; to the product add the remainder, and the sum will be equal to the dividend, if the work be right.

EXAMPLES.

	Dividend.	
Divisor	2)694568946	3)2768954584
Quotient	347284473	922984861
	2	3
Proof	694568946	2768954584

	Dividend..	Quotient..
Divisor.	52)6495436	(124912
	52	52
	129	249824
	104	624560
		12 Rem..
	255	
	208	6495436 Proof..
	474	
	468	
	63	
	52	
	116	
	104	
	12	

			Quotient.	Rem.
4	Divide 8965462	by 6	Ans. 1494243	and 4
5	3728675	8	466084	3
6	4654682	9	517186	8
7	2768967	10	276896	7
8	1949952	11	177268	4
9	2968967	12	247413	11
10	5268794	20	263439	14
11	29619145	40	740478	25
12	419825367	500	839650	367
13	296876234	64	4638691	10
14	47989536925	735	65291886	715
15	26574983184	8962	2965296	432
16	53479689236	7684	6959876	2052
17	4917968967	2359	2084768	1255
18	3258675689	67435	48323	14184

When the divisor is a compound number, that is, if any two figures, being multiplied together, will make that number, then divide the dividend by one of those figures, and the first quotient by the other figure, and it will then give the quotient required.—But as it sometimes happens that there is a remainder to each of the quotients, and neither of them the true one, it may be found by this

RULE. Multiply the first divisor by the last remainder, and to the product add the first remainder, which will give the true one.

EXAMPLES.

Divide 296876234. by 64

8)296876234

8)37109529—2

Quotient 4638691 and $1 \times 8 + 2 = 10$ remaining.

Divide 8757635 by 28

Divide 18957492 by 42

Quotient 312772 and 19 rem.

451368 and 36 rem.

Divide 1571196 by 72

Divide 3751749 by 96

Quotient 21822 and 12 rem.

39080 and 69 rem.

MISCELLANEOUS QUESTIONS.

1. Add 562163, 21964, 56321, 18536, 4340, 279, and 83 together. Ans. 663686.
2. What number is it, which being added to 9709 will make 110901? Ans. 101192.
3. General WASHINGTON was born in the year 1732; how old was he in 1799? Ans. 67 years.
4. Add up twice 397, three times 794, four times 3176, five times 15880, six times 95280, and once 333040. Ans. One Million.
5. A cashier received, viz. Four hundred and nine dollars, Twenty thousand and thirteen dollars, Eight thousand five hundred and ten dollars, Nine hundred and twenty-eight dollars; of which he paid away Fifteen thousand fifteen hundred and fifteen dollars: What was the whole sum he received, and how much remains after deducting the payment? Ans. He received 29860 dolls. and there remains 13345 dolls.
6. What is the product of 15927 multiplied by 4009? Ans. 63851343.
7. 128 men have one half of a prize, worth 34560 dollars, to be equally divided between them: What is each man's part? Ans. 135 dollars.
8. Three merchants, A, B, and C, have a stock of 14876 dollars, of which A put in 4963 dolls. B 5188 dolls. and C the remainder: How much did C put in? Ans. 4715 dollars.

.....

TABLE OF MONEY, WEIGHTS, MEASURES, &c.

FEDERAL MONEY.

10 Mills.....	make.....	1 Cent.
10 Cents.....	.....	1 Dime.
10 Dimes, or 100 Cents.....	.....	1 Dollar.
10 Dollars .....	.....	1 Eagle.

ENGLISH MONEY.

4 Farthings	make.....	1 Penny.
12 Pence .....	.....	1 Shilling.
20 Shillings .....	.....	1 Pound.

PENCE TABLE.

d.	s.	d.
20....are..	1	8
30.....	2	6
40.....	3	4
50.....	4	2
60.....	5	0
70.....	5	10
80.....	6	8
90.....	7	6
100.....	8	4
110.....	9	2
120.....	10	0
130.....	10	10
140.....	11	8
150.....	12	6
200.....	16	8

SHILLINGS TABLE.

s.	£.	s.
20....are....	1	0
30.....	1	10
40.....	2	0
50.....	2	10
60.....	3	0
70.....	3	10
80.....	4	0
90.....	4	10
100.....	5	0
110.....	5	10
120.....	6	0
130.....	6	10
140.....	7	0
150.....	7	10
200.....	10	0

TROY WEIGHT.

- 24 Grains.....make.....1 Pennyweight.
 20 Pennyweights 1 Ounce.
 12 Ounces..... 1 Pound.

NOTE. By this weight are weighed jewels, gold, silver and liquors.

AVOIRDUPOIS WEIGHT.

- 16 Drams.....make.....1 Ounce.
 16 Ounces..... 1 Pound.
 28 Pounds..... 1 Quarter.
 4 Quarters 1 Hundred weight.
 20 Hundred weight 1 Ton.

NOTE. By this weight are weighed such commodities as are coarse and subject to waste, and all metals, except gold and silver. One pound Avoirdupois is equal to 14 oz. 11 pwt. and 15½ grs. Troy.

APOTHECARIES WEIGHT.

- 20 Grains.....make.....1 Scruple.
 3 Scruples 1 Dram.
 8 Drams..... 1 Ounce.
 12 Ounces 1 Pound..

NOTE. Apothecaries use this weight in compounding their medicines; but they buy and sell their drugs by Avoirdupois weight.

CLOTH MEASURE.

- 4 Nails.....make.....1 Quarter..
 4 Quarters 1 Yard.
 3 Quarters 1 Ell Flemish..
 5 Quarters 1 Ell English..
 6 Quarters 1 Ell French..

LONG MEASURE.

3 Barley Corns.....	make.....	1 Inch.
12 Inches		1 Foot.
3 Feet		1 Yard.
5½ Yards, or 16½ Feet.....		1 Pole, Rod, or Perch.
40 Poles.....		1 Furlong.
8 Furlongs		1 Mile.
3 Miles.....		1 League.
60 Geographical, or } 69½ Statute Miles }	.....	1 Degree.

NOTE. In this measure, length only is considered.

LAND OR SQUARE MEASURE.

144 Square Inches....	make....	1 Square Foot.
9 Feet.....		1 Yard.
30½ Yards, or } 272½ Feet }	.....	1 Pole, Rod, or Perch.
40 Poles or Perches.....		1 Rood.
4 Roods.....		1 Acre.

NOTE. This measure respects length and breadth.

WINE MEASURE.

2 Pints.....	make.....	1 Quart.
4 Quarts		1 Gallon.
42 Gallons.....		1 Tierce.
63 Gallons.....		1 Hogshead.
84 Gallons.....		1 Puncheon.
2 Hogsheads.....		1 Pipe or Butt.
2 Pipes or 4 Hogsheads		1 Tun.

NOTE. The wine gallon contains 231 cubic inches.

ALE AND BEER MEASURE.

2 Pints.....	make.....	1 Quart.
4 Quarts		1 Gallon.
8 Gallons.....		1 Firkin of Ale.
9 Gallons.....		1 Firkin of Beer.
2 Firkins		1 Kilderkin.
2 Kilderkins.....		1 Barrel.
34 Gallons.....		1 Hhd. of Beer.
3 Barrels		1 Butt.

NOTE. The ale gallon contains 282 cubic inches.

MONEY, WEIGHTS, MEASURES, &c.

CUBIC OR SOLID MEASURE.

1728 Inches.....	make.....	1 Foot.
27 Feet.....	.....	1 Yard.
40 Feet of round Timber or	}	..... 1 Ton or Load.
50 Feet of hewn Timber		
128 Solid Feet .....	.....	1 Cord of Wood.

NOTE. 8 feet in length, 4 in breadth, and 4 in height, making 128 solid feet, contain a cord of wood. This measure respects length, breadth and thickness.

DRY MEASURE.

2 Pints.....	make.....	1 Quart.
2 Quarts .....	.....	1 Pottle.
2 Pottles .....	.....	1 Gallon.
2 Gallons.....	.....	1 Peck.
4 Pecks.....	.....	1 Bushel.
2 Bushels .....	.....	1 Strike.
4 Bushels .....	.....	1 Coom.
8 Bushels .....	.....	1 Quarter.
36 Bushels .....	.....	1 Chaldron.
5 Quarters .....	.....	1 Wey.
2 Weys .....	.....	1 Last.

NOTE. The gallon dry measure contains 268½ cubic inches.

TIME.

60 Seconds	make.....	1 Minute.
60 Minutes .....	.....	1 Hour.
24 Hours.....	.....	1 Day.
365 Days .....	.....	1 Year.

NOTE. 365 days 5 hours 48 minutes 57 seconds make a solar year, according to the most exact observation.

The number of days in each month is thus found :

*Thirty days hath September, April, June, and November ;
February hath twenty-eight alone, and all the rest have thirty-one.*

When the year can be divided by 4 without a remainder, it is Bissextile or Leap Year, in which February hath 29 days.

COMPOUND ADDITION

Teacheth to collect numbers of different denominations into one total.

FEDERAL MONEY.

<i>D.</i>	<i>C.</i>	<i>M.</i>	<i>D.</i>	<i>C.</i>	<i>M.</i>
174	74	3	396	14	4
198	19	3	147	49	5
157	14	4	149	57	9
196	76	9	157	83	8
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ENGLISH MONEY.

<i>£.</i>	<i>s.</i>	<i>d.</i>	<i>£.</i>	<i>s.</i>	<i>d.</i>
149	14	6 $\frac{1}{2}$	814	16	6 $\frac{1}{2}$
387	19	8 $\frac{1}{2}$	198	18	8 $\frac{1}{2}$
259	16	7 $\frac{1}{2}$	376	14	9 $\frac{1}{2}$
874	17	4 $\frac{1}{2}$	226	16	7 $\frac{1}{2}$
678	15	6 $\frac{1}{2}$	174	17	10 $\frac{1}{2}$
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TROY WEIGHT.

<i>lb.</i>	<i>oz.</i>	<i>dwt.</i>	<i>gr.</i>	<i>lb.</i>	<i>oz.</i>	<i>dwt.</i>	<i>gr.</i>
48	7	14	19	83	11	15	22
95	4	17	22	15	6	16	19
27	5	14	15	21	8	19	23
65	6	19	16	33	9	15	14
19	7	13	15	46	4	13	17
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AVOIRDUPOIS WEIGHT.

<i>Ton.</i>	<i>Cwt.</i>	<i>gr.</i>	<i>lb.</i>	<i>oz.</i>	<i>dr.</i>	<i>Cwt.</i>	<i>gr.</i>	<i>lb.</i>
18	17	1	14	13	13	593	1	19
36	15	3	16	13	15	187	3	19
29	15	2	19	12	13	159	2	25
14	16	3	27	14	12	283	3	13
16	19	2	25	13	10	146	2	18
37	17	1	14	15	9	259	1	22
<hr/>						<hr/>		
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COMPOUND ADDITION.

APOTHECARIES' WEIGHT.

<i>lb.</i>	<i>oz.</i>	<i>dr.</i>	<i>sc.</i>	<i>gr.</i>
3	7	5	1	17
1	3	2	2	13
2	5	3	2	14
3	4	2	1	15
5	2	2	2	17
2	3	1	2	18

<i>lb.</i>	<i>oz.</i>	<i>dr.</i>	<i>sc.</i>	<i>gr.</i>
2	5	3	2	11
1	2	2	1	14
3	3	5	2	13
5	5	4	1	12
2	9	3	2	15
1	6	4	2	17

CLOTH MEASURE.

<i>yd.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.Fl.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.Fr.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.E.</i>	<i>qr.</i>	<i>nl.</i>
571	1	3	873	2	3	181	2	2	56	1	2
184	2	2	196	2	2	196	3	3	19	2	3
196	2	3	158	1	1	157	4	2	14	3	2
283	3	2	147	2	3	168	3	3	26	4	3
146	2	3	326	2	2	193	5	2	83	2	2
375	3	2	194	2	1	214	2	3	57	3	3

WINE MEASURE.

<i>Tun.</i>	<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>	<i>Tun.</i>	<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
187	1	17	3	1	176	3	16	2	1
56	3	15	2	1	59	2	57	3	1
9	1	29	3	1	8	3	14	2	1
36	2	18	2	1	17	2	19	1	1
217	3	57	1	1	168	1	38	2	1
56	1	46	2	1	25	2	52	3	1

ALE AND BEER MEASURE.

<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>	<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
49	38	2	1	78	17	3	1
38	45	3	1	19	16	2	1
57	48	2	1	15	51	3	1
49	37	1	1	76	43	2	1
57	26	2	1	23	26	3	1
28	18	3	1	52	38	2	1

COMPOUND ADDITION.

25

DRY MEASURE.

<i>qr.</i>	<i>bush.</i>	<i>pk.</i>	<i>qt.</i>	<i>chal.</i>	<i>bush.</i>	<i>pk.</i>	<i>qt.</i>
57	4	2	1	576	31	1	3
19	5	3	1	19	27	2	2
38	6	2	3	56	15	3	5
27	7	3	7	25	8	2	4
5	3	1	4	9	9	1	6
9	2	2	3	14	15	2	3
72	5	3	2	32	26	3	2

LONG MEASURE.

<i>deg.</i>	<i>mil.</i>	<i>fur.</i>	<i>po.</i>	<i>ft.</i>	<i>in.</i>	<i>bar.</i>	<i>mil.</i>	<i>fur.</i>	<i>po.</i>	<i>yd.</i>	<i>ft.</i>
217	17	7	19	14	9	1	876	7	13	4	2
733	17	4	16	13	3	2	129	6	26	2	1
283	53	5	19	12	2	2	167	4	19	3	2
346	26	6	23	13	4	1	157	3	15	2	2
189	32	3	27	14	5	2	286	2	27	1	1
176	14	2	15	15	6	2	194	5	32	2	2
921	15	4	18	16	7	1	176	4	18	5	2

LAND MEASURE.

<i>acr.</i>	<i>roo.</i>	<i>per.</i>	<i>acr.</i>	<i>roo.</i>	<i>per.</i>
741	1	19	870	3	19
69	3	29	19	2	16
15	2	16	54	3	37
37	3	14	129	2	26
16	2	13	187	3	14
29	3	27	136	2	19

TIME.

<i>yrs.</i>	<i>days.</i>	<i>hrs.</i>	<i>min.</i>	<i>sec.</i>	<i>yrs.</i>	<i>days.</i>	<i>hrs.</i>	<i>min.</i>	<i>sec.</i>
187	149	14	13	12	300	169	14	16	17
146	126	16	16	16	19	186	17	16	16
59	186	19	39	19	46	147	15	19	19
28	140	21	46	35	87	196	23	46	47
7	119	22	18	26	157	219	14	23	16
146	146	19	57	19	46	138	15	42	13

COMPOUND SUBTRACTION.

COMPOUND SUBTRACTION

Teacheth to find the inequality between numbers of divers denominations.

FEDERAL MONEY.

	dol.	ct.	m.		dol.	ct.	m.		dol.	ct.	m.
From	1901	95	1		435	00	1		170	10	3
Take	992	97	2		9	15	9		9	50	2
	<hr/>				<hr/>				<hr/>		

ENGLISH MONEY.

	£.	s.	d.		£.	s.	d.
From	191	11	3½		304	19	8½
Take	114	16	2½		126	16	8½
	<hr/>				<hr/>		
From	389	18	0½		100	0	5
Take	9	19	4		11	11	2½
	<hr/>				<hr/>		

TROY WEIGHT.

	lb.	oz.	dwt.	gr.		lb.	oz.	dwt.	gr.
From	87	11	11	13		27	10	15	22
Take	19	11	14	22		15	9	16	23
	<hr/>					<hr/>			

AVOIRDUPOIS WEIGHT.

	ton.	cwt.	qr.	lb.	oz.	dr.		cwt.	qr.	lb.
From	100	10	1	11	14	13		59	1	11
Take	15	13	1	18	12	15		19	3	27
	<hr/>							<hr/>		

APOTHECARIES' WEIGHT.

	lb.	oz.	dr.	sc.	gr.		lb.	oz.	dr.	sc.	gr.
From	2	3	4	1	13		2	1	3	1	15
Take	1	7	5	2	10		1	4	2	2	17
	<hr/>						<hr/>				

27

	<i>yd.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.Fl.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.E.</i>	<i>qr.</i>	<i>nl.</i>	<i>E.Fr.</i>	<i>qr.</i>	<i>nl.</i>
From	251	1	2	189	2	1	419	1	3	389	2	2
Take	127	3	3	120	2	2	174	3	2	189	5	3
	<hr/>			<hr/>			<hr/>			<hr/>		

	<i>tun.</i>	<i>hhd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>		<i>tun.</i>	<i>hd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>	
From	594	1	13	1	1		800	1	50	2	1	
Take	126	2	56	3	1		149	2	61	3	1	
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	<i>hd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>		<i>hd.</i>	<i>gal.</i>	<i>qt.</i>	<i>pt.</i>
From	571	19	3	1		100	36	2	1
Take	198	53	2	1		9	27	3	1
	<hr/>					<hr/>			

	qr.	bu.	gal.	qt.		chal.	bu.	gal.	qt.
From	38	4	5	3		69	21	3	2
Take	17	5	1	2		49	33	5	3
	<hr/>					<hr/>			

	<i>deg.</i>	<i>m.</i>	<i>fur.</i>	<i>p.</i>	<i>f.</i>	<i>in.</i>	<i>b.</i>		<i>m.</i>	<i>fur.</i>	<i>p.</i>	<i>f.</i>
From	819	13	1	19	11	3	1		219	3	14	11
Take	159	49	2	27	16	8	2		209	7	15	12

	<i>acr. roo. per.</i>	<i>acr. roo. per.</i>	<i>acr. roo. per.</i>
From	591 1 11	501 3 13	219 2 21
Take	129 3 15	190 2 21	156 1 36
	<hr/>	<hr/>	<hr/>

	yrs.	da.	hr.	m.	sec.		yrs.	da.	hr.	m.	sec.
From	171	143	11	14	19		811	111	15	23	52
Take	128	174	19	51	14		389	190	21	48	54

PRACTICAL QUESTIONS IN COMPOUND ADDITION AND SUBTRACTION.

1. CAST up the following sums, viz. twenty-three shillings and five pence, one pound and nine pence, seven shillings and eleven pence three farthings, twenty pounds thirteen shillings and nine pence, fifteen pence three farthings.

	£.	s.	d.
	1	3	5
	1	0	9
	0	7	11½
	20	13	9
	0	1	3½
Ans.	£. 23	7	2½
Proof	£. 23	7	2½

2. Twenty dollars and four cents, five dollars and three mills, eighty-two cents, six dollars and five mills.

Ans. 31 dols. 86 cts. 8 m.

3. Seventy dollars, three dollars and three cents, thirty-four cents and four mills, eighty dollars and a half, six dollars and a quarter.

Ans. 160 dols. 12 cts. 4 mills.

4. Ten pounds and three pence, forty-five shillings and ten-pence half penny, thirty-seven shillings and four-pence three farthings, nine pounds and three farthings, one shilling and six pence farthing, eighty-two shillings and four-pence half-penny.

Ans. £. 27 7 5½

5. Thirty dollars six cents and a half, fifty-three cents and three quarters, eleven cents and a quarter, nine dollars eleven cents and a half, fifty-four cents.

Ans. 40 dols. 37 cents.

6. Take three shillings and four pence from one pound two shillings and a penny.

Ans. 18s. 9d.

7. From £. 5 2s. 1d. take nine shillings and six-pence half-penny.

Ans. £. 4 12 6½

8. Take twenty shillings and three farthings from £. 8.

Ans. £. 6 19 11½

9. From 18 dollars take eight mills.

Ans. 17 dols. 99 cts. 2 m.

10. Take 53 dimes from 53 eagles.

Ans. 524 dols. 7 dimes or 70 cts.

11. A merchant bought 112 bars of iron, weighing 56 cwt. 1 qr. 11 lb. of which he sold 59 bars, weighing 29 cwt. 3 qrs.

A. Denton

REDUCTION.

29

21 lb. ; how many bars has he remaining, and what is the weight ? Ans. 53 bars, weighing 26 cwt. 1 qr. 18 lb.

12. Required the total weight of 4 hogsheads of sugar, weighing as follows, viz. No. 1. 9 cwt. 2 qrs. 21 lb. No. 2. 10 cwt. 3 qrs. 23 lb. No. 3. 8 cwt. 2 qrs. 25 lb. No. 4. 9 cwt. 3 qrs. 17 lb. Ans. 39 cwt. 1 qr. 2 lb.

13. A ropemaker received 3 tons 15 cwt. 3 qrs. 14 lb. of hemp to be wrought, of which he delivered in cordage 34 cwt. 1 qr. 22 lb. ; how much remains ?

Ans. 2 tons 1 cwt. 1 qr. 20 lb.

14. Received 57953 mills, 4953 cents, 1913 dimes, and 45 eagles ; required the total sum ?

Ans. 748 dols. 78 cts. 3 mills.

15. A cashier received, viz. one hundred pounds and nine-pence half-penny, three thousand seven hundred and four pounds ten shillings, twenty thousand and ninety pounds two shillings and eleven pence three farthings, of which he paid away sixteen thousand sixteen hundred and sixteen pounds ; how much has he on hand ? Ans. £.6278 13. 9½

16. A farmer bought three pieces of land, measuring, viz. the first piece 21 acres 3 roods 19 poles ; the second, 37 acres. 2 roods 29 poles ; the third, 27 acres 2 roods 25 poles ; of which he sells 15 acres 2 roods 39 poles ; how much has he remaining ? Ans. 71 acres 1 rood 34 poles.

17. A has paid B £.9 15 6½, £.19 11 9½, £.14 19 7½, and 54s. 3½d. on account of a debt of £.50 ; how much is there still unpaid ? Ans. £.2 18 9½

.....

REDUCTION.

REDUCTION teacheth to change numbers from one denomination to another, without losing their value.

RULE. When the Reduction is descending, multiply the highest denomination by as many of the next less as make one of the greater, adding to the product the parts of the same name, and so on to the last.

When the Reduction is ascending, divide the given number by as many of that denomination as make one of the next higher, and so on to the denomination required, and the last quotient with the several remainders, (if any), will be the answer.

The proof is by reversing the question.

REDUCTION.

FEDERAL MONEY.

1. In 53 dollars how many mills ?
 53 dolls. } Or decimally, by adding a cypher
 10 } for each inferior denomination, thus,
 ———
 530 dimes.
 10
 ———
 5300 cents.
 10
 ———

Ans. 53000 mills.

dols.d.c.m.

53,000

2. In 14000 mills how many dollars ?
 10)14000 } Or decimally, by separating the figures,
 ——— } counting from the right to the name
 10)1400 } required, thus,
 ———
 10)140 }

Ans. 14 dolls.

dols.d.c.m.

14,000

3. In 57935 mills how many dollars ?
 Ans. 57 dollars, 93 cents, and 5 mills.
 4. How many eagles in 1933 dimes ?
 Ans. 19 eagles, 3 dollars, 3 dimes.
 5. In 1290 mills how many dimes ?
 Ans. 12 dimes and 9 cents.
 6. How many cents in 46 dollars ?
 Ans. 4600.
 7. In 190004 mills how many dollars ?
 Ans. 190 dollars and 4 mills.

ENGLISH MONEY.

1. In £.91 11 3½ how many farthings ?

91 11 3½

20

1831 shillings.

12

21975 pence.

4

Proof.

4)87902

12)21975—2

20)1831—3

£.91 11 3½

Ans. 87902 farthings.

2. How many pounds in 3175 farthings ? Ans. £.3 6 1½

REDUCTION.

32

3. In 19s. 8½d. how many farthings? *Ans.* 947 farthings.
 4. How many pounds in 9752 pence? *Ans.* £.40 12 8
 5. In £.46 how many crowns of 6s. 7d. each?
Ans. 139 crowns and 4 shillings and 11 pence.
 6. How many pounds in 493 dollars? *Ans.* £.147 18
 7. In 143 pence, how many shillings? *Ans.* 11s. 11d.
 8. Reduce 38s. 4½d. to half pence. *Ans.* 921 half pence.
- Prove the above answers to be right.

TROY WEIGHT.

1. In 15lb. troy how many grains? *Ans.* 86400 grs.
2. How many ounces in 5749 dwt.? *Ans.* 287 oz. 9 dwt.
3. In 11 oz. 13 dwt. 13 grs. how many grains?
Ans. 5605 grs.
4. How many grains in 15 spoons, each weighing 6 dwt. 15 grs.? *Ans.* 2385 grs.

AVOIRDUPOIS WEIGHT.

1. In 19 tons 14 cwt. 2 qrs. 19 lb. 11 oz. 13 drs. how many drams? *Ans.* 11316157 drs.
2. How many cwt. in 9563 lb.? *Ans.* 85 cwt. 1 qr. 15 lb.
3. In 13 cwt. 3 qrs. 21 lb. how many pounds? *Ans.* 1561 lb.
4. How many mess-pieces of 4½ lb. and 3½ lb. of each an equal number, in 3½ cwt. 1 qr. 12 lb. of beef? *Ans.* 439 pieces of each.

WINE MEASURE.

1. In 25 tuns of wine how many pints? *Ans.* 50400 pints.
2. How many hogsheads in 4935 quarts? *Ans.* 19h. 86g. 3 qt.
3. In 3 hhds. 13 gals. 2 qts. how many half pints? *Ans.* 3240 half pints.

CLOTH MEASURE.

1. In 158 yards how many nails? *Ans.* 2528 nails.
2. How many ells English in 5932 nails? *Ans.* 296 ells 3 qrs.
3. In 29 pieces of holland, each containing 36 ells Flemish, how many yards? *Ans.* 783 yds.

REDUCTION.

LONG MEASURE.

1. In 29 miles how many inches? Ans. 1837440 inches.
2. How many furlongs in 19753 yards?
Ans. 89 fur. 173 yds.
3. In 590057 inches how many leagues?
Ans. 3 leag. 2 fur. 110 yds. 1 f. 5 in.

TIME.

1. How many hours in 57 years, allowing each year to be 365 days 6 hours? Ans. 499662 hours.
2. In 57953 hours how many weeks?
Ans. 344 w. 6 da. 17 hr.
3. How many days from 19th of March to the 23d September following? Ans. 188 days.
4. How many days from 24th May, 1797, to 15th December, 1798? Ans. 570 days.

LAND MEASURE.

1. In 41 acres 2 roods 14 perches, how many rods?
Ans. 6654 rods or perches.
2. How many square rods in 7752 square feet?
Ans. 28 rods 129 feet.
3. In 5972 perches, how many acres?
Ans. 37 ac. 1 rood 12 per.

SOLID MEASURE.

1. In a pile of wood 96 feet long, 5 feet high, and 4 feet wide, how many cords? Ans. 15 cords.
2. In 82 tons of round timber how many inches?
Ans. 5667840 inches.
3. What are the contents of a load of wood, 6 feet long, 4 feet high, and 2½ feet wide? Ans. 3½ feet.

GRINDSTONES are sold by the cubic foot, commonly called a stone, and the contents are thus found :-

RULE. To the whole diameter add half of the diameter, and multiply the sum of these by the same half, and this product by the thickness; divide this last number by 1728, the inches in a cubic foot, and the quotient is the contents, or answer required.

REDUCTION.

33

EXAMPLES.

4. How many cubic feet in a grindstone, 24 inches diameter, and 4 inches thick?

24 diameter.
12 half diameter.

$$\begin{array}{r} 36 \\ 12 \\ \hline 432 \\ 4 \text{ thickness.} \end{array}$$

$$1728 \overline{) 1728}$$

Ans. 1 foot.

5. What are the contents of a grindstone, 36 inches diameter, and 4 inches thick?

$$\begin{array}{r} 36 \\ 18 \\ \hline 54 \\ 18 \\ \hline 432 \\ 54 \end{array}$$

$$\begin{array}{r} 972 \\ 4 \end{array}$$

$$1728 \overline{) 3888} (2\frac{1}{2}$$

$$3456$$

$$\begin{array}{r} 432 \\ 4 \end{array}$$

$$1728 \overline{) 1728} (1$$

$$1728$$

Ans. $2\frac{1}{2}$ cubic feet.

AMERICAN MONIES.

To change New-England and Virginia currency to Federal money, the dollar being 6 shillings.

RULE. As the value of a dollar is equal to three tenths of a pound, when pounds are given to be changed, annex three cyphers to the sum, and divide the whole by 3; the quotient is the answer in cents.

EXAMPLES.

1. Change £.523 to Federal money.

$$\begin{array}{r} 3 \overline{) 523000} \\ \hline \end{array}$$

174333 $\frac{1}{3}$ cents. Ans. 1743 dols. 33 $\frac{1}{3}$ cts.

Change the following sums, viz.

£.	dols. cts.
2. 184	Ans. 613 33 $\frac{1}{3}$
3. 29	96 66 $\frac{2}{3}$
4. 57	190
5. 219	730
6. 81	270
7. 127	423 33 $\frac{1}{3}$

When pounds and shillings are given, to the pounds annex half the number of shillings and two cyphers, if the number of shillings in the given sum be even; but if the number be odd, annex half the number, and then 5 and one cypher, and divide by 3; the quotient is the answer in cents.

EXAMPLES.

1. Change £.59 18s. to Federal money.

$$\begin{array}{r} 3 \overline{) 59900} \\ \hline \end{array}$$

19966 $\frac{2}{3}$ cts. Ans. 199 dols. 66 $\frac{2}{3}$ cts.

2. Change £.93 13s. to Federal money.

$$\begin{array}{r} 3 \overline{) 93650} \\ \hline \end{array}$$

31216 $\frac{2}{3}$ cts. Ans. 312 dols. 16 $\frac{2}{3}$ cts.

Change the following sums, viz.

£. s.	dols. cts.
3. 129 13	Ans. 432 16 $\frac{2}{3}$
4. 68 15	212 50
5. 27 18	93
6. 182 19	609 83 $\frac{1}{3}$
7. 57 16	192 66 $\frac{2}{3}$
8. 121 7	404 50

When there are shillings, pence, &c. in the given sum, annex for the shillings as before directed, and to these add the farthings in the given pence and farthings, observing to increase their number by one when they exceed 12, and by two when they exceed 37, and divide as before.

EXAMPLES.

1. Change £.21 8s. 4½d. to Federal money.

3)21419

7139½ cts.

4 is annexed to the pounds for half the shillings, and 19 for the farthings in 4½d. and excess of 12.

Ans. 71 dols. 39½ cts.

2. Change £.117 16s. 2d. to Federal money.

3)117808

39269½ cts.

Ans. 392 dols. 69½ cts.

3. Change £.721 9s. 11½d. to Federal money.

3)721497

240499 cts.

In this example 4 is annexed to the pounds for half the even shillings, and 47 for the farthings in 11½d. and excess of 37, and then 5 is added to the figure next to half the shillings, making it 9 in place of 4 for the odd shilling.

Ans. 2404 dols. 99 cts.

4. Change £.29 11s. 2½d. to Federal money.

3)29559

9853 cts.

Ans. 98 dols. 53 cts.

Change the following sums, viz.

	£.	s.	d.	dols.	cts.
5.	25	19	9	Ans. 86	62½
6.	24	11	7½	81	94
7.	1238	10	9½	4128	46½
8.	2001	1	3½	6670	21½
9.	152	17	6	512	91½

A TABLE

FOR CHANGING SHILLINGS AND PENCE INTO CENTS
AND MILLS.

pence.	0		shill.	shill.	shill.	shill.	shill.
	cts. m.	cts. m.	cts. m.	cts. m.	cts. m.	cts. m.	cts. m.
0			16 7	33 3	50 0	66 7	83 3
1	1 4		18 1	34 7	51 4	68 1	84 7
2	2 8		19 5	36 1	52 8	69 5	86 1
3	4 2		20 9	37 5	54 2	70 9	87 5
4	5 6		22 3	38 9	55 6	72 3	88 9
5	7 0		23 7	40 3	57 0	73 7	90 3
6	8 3		25 0	41 7	58 3	75 0	91 7
7	9 7		26 4	43 0	59 7	76 4	93 0
8	11 1		27 8	44 4	61 1	77 8	94 4
9	12 5		29 2	45 8	62 5	79 2	95 8
10	13 9		30 6	47 2	63 9	80 6	97 2
11	15 3		32 0	48 6	65 3	82 0	98 6

*To change Federal Money to New-England and Virginia
Currency.*

RULE. When the sum is dollars only, multiply it by 3 and double the first figure of the product for shillings, and the rest of the product will be pounds.

When there are cents in the given sum, multiply the whole by 3, and cut off three figures of the product to the right hand as a remainder.

Multiply this remainder by 20 and cut off as before.

Proceed in this manner through the several parts of a pound, and the numbers standing on the left hand, make the answer, in the several denominations.

NOTE. If there be mills, cut off four figures and proceed as above.

EXAMPLE.

1. Change 872 dollars to New-England currency.

$$\begin{array}{r}
 872 \\
 \times 3 \\
 \hline
 261 \ 12
 \end{array}
 \qquad
 \begin{array}{r}
 \text{£. s.} \\
 \text{Ans. } 261 \ 12
 \end{array}$$

REDUCTION.

37

2. Change 1971 dols. 96½ cts.
to Massachusetts currency.

1971 96½
3

£.591,590

20

s. 11,800

12

d. 9,600

4

f. 2,400

Ans. £.591 11 9½

3. Reduce 1259 dols. 89 cts.
and 7 mills, to Mass. currency.

1259 89 7
3

£.377,9691

20

s. 19,3820

12

d. 4,5840

4

f. 2,3360

Ans. £.377 19 4½

A TABLE

For changing Cents into Shillings, Pence, and Farthings.

cents	d.	Cents. 10		Cents. 20		Cents. 30		Cents. 40		Cents. 50		Cents. 60		Cents. 70		Cents. 80		Cents. 90	
		s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.	s.	d.
0			7½	1	2½	1	9½	2	4½	3	0½	3	7½	4	2½	4	9½	5	4½
1	¼		8	1	3	1	10½	2	5½	3	0½	3	8	4	3½	4	10½	5	5½
2	½		8½	1	3½	1	11	2	6½	3	1½	3	8½	4	3½	4	11	5	6½
3	¾		9	1	4	1	11½	2	7	3	2½	3	9	4	4½	4	11½	5	7
4			9½	1	4½	2	0½	2	7½	3	2½	3	9½	4	5½	5	0½	5	7½
5	¼		10	1	5	2	1½	2	8	3	3½	3	10	4	6	5	1½	5	8½
6	½		10½	1	5½	2	2	2	9	3	4½	3	10½	4	6½	5	2	5	9
7	¾		11	1	6	2	2½	2	9½	3	5	4	0½	4	7½	5	2½	5	9½
8			11½	1	6½	2	3	2	10	3	5½	4	1	4	8	5	3½	5	10½
9	¼		12	1	7	2	3½	2	10½	3	6	4	1½	4	8½	5	4	5	11

To change New-York and North-Carolina currency to Federal money, the dollar being 8 shillings.

RULE. Prepare the given sum by the rule for New-England money, and divide by 4; the quotient is the answer in cents.

EXAMPLES.

1. Change £.461 to Federal money.

4)461000

115250 cts. Ans. 1152 dols. 50 cts.

2. Change £.419 10s. 8½d. to Federal money.

$$\begin{array}{r} 4 \overline{)419535} \end{array}$$

104883½ cts. Ans. 1048 dolls. 83½ cts.

To change Federal money to New-York and North-Carolina currency.

RULE. As for Massachusetts currency, using 4 as a multiplier instead of 3; the value of a dollar being equal to four-tenths of a pound.

EXAMPLES.

1. Change 1684 dollars to New-York and North-Carolina currency.

$$\begin{array}{r} 1684 \\ 4 \overline{) } \end{array}$$

Ans. £.673 12

2. Change 1048 dolls. 83½ cents to New-York currency.

$$\begin{array}{r} 1048,83\frac{1}{2} \\ 4 \overline{) } \end{array}$$

$$\begin{array}{r} 419,535 \\ 20 \overline{) } \end{array}$$

$$\begin{array}{r} 10,700 \\ 12 \overline{) } \end{array}$$

$$\begin{array}{r} 8,400 \\ 4 \overline{) } \end{array}$$

1,600 Ans. £.419 10s. 8½d.

To change New-Jersey, Pennsylvania, Delaware and Maryland currency to Federal money, the dollar being 7s. 6d.

RULE. As the value of a dollar is equal to $\frac{3}{4}$ of a pound, multiply the given sum, when it is pounds only, by 8, and divide by 3 for dollars. If there be shillings, &c. increase the sum in pence by $\frac{1}{3}$ of the whole sum for cents.

EXAMPLES.

1. Change £.471 to Federal money.

$$\begin{array}{r} 471 \\ 8 \overline{) } \end{array}$$

$$\begin{array}{r} 3 \overline{)3768} \end{array}$$

Ans. 1256 dollars.

2. Change £.480 19s. 9d. to Federal money.

$$\begin{array}{r}
 480 \ 19 \ 9 \\
 \underline{20} \\
 9619 \\
 \underline{12} \\
 9)115437 \\
 12826\frac{1}{2}
 \end{array}$$

128263 $\frac{1}{2}$ cents. Ans. 1282 dolls. 63 $\frac{1}{2}$ cts.

To change Federal money to New-Jersey, Pennsylvania, Delaware and Maryland currency.

RULE. Multiply the sum, when in dollars, by 3, and divide by 8 for pounds. If there be dollars and cents, multiply the given sum by 90, and the product (rejecting two figures on the right) is pence, or deducting $\frac{1}{10}$ of the sum gives the pence likewise.

EXAMPLES.

1. Change 1256 dollars to Pennsylvania currency.

$$\begin{array}{r}
 1256 \\
 \underline{3} \\
 8)3768
 \end{array}$$

Ans. £.471

2. Change 1282 dolls. 63
- $\frac{1}{2}$
- cts. to Pennsylvania currency.

$$\begin{array}{r}
 128263\frac{1}{2} \\
 \underline{90} \\
 12)115437,00 \\
 20)9619-9
 \end{array}
 \qquad
 \begin{array}{r}
 \text{Or } \frac{1}{10})128263\frac{1}{2} \\
 \underline{12826\frac{1}{2}} \\
 12)115437 \\
 20)9619-9
 \end{array}$$

Ans. £.480 19 9

£.480 19 9 as before.

To change South-Carolina and Georgia currency to Federal money, the dollar being 4s. 8d.

RULE. As the value of a dollar is equal to $\frac{7}{8}$ of a pound, if the sum be pounds only, multiply it by 30, and divide by 7 for dollars. If there be shillings, &c. annex two cyphers to the pence in the given sum, and divide by 56, the pence in a dollar, the quotient is the answer in cents.

REDUCTION.

EXAMPLES.

1. Change £.28 to Federal money.

$$\begin{array}{r} 28 \\ 30 \\ \hline 7 \overline{)840} \end{array}$$

2. Change £.11 4 8 to Federal money.
- Ans. 120 dolls.

$$\begin{array}{r} 120 \\ 11 \ 4 \ 8 \\ 20 \\ \hline 224 \\ 12 \\ \hline \end{array}$$

$$8 \times 7 = 56 \quad \begin{array}{r} 8 \overline{)269600} \\ 7 \overline{)33700} \end{array}$$

4814 $\frac{2}{3}$ cts. Ans. 48 dolls. 14 $\frac{2}{3}$ cts.

To change Federal money to South-Carolina & Georgia currency.

RULE. Multiply the dollars by 7, and divide by 30 for pounds. If there be dollars and cents multiply by 56, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 540 dollars to S. Carolina and Georgia currency.

$$\begin{array}{r} 540 \\ 7 \\ \hline 3 \overline{)03780} \end{array}$$

Ans. £.126

2. Change 48 dolls. 14
- $\frac{2}{3}$
- cts. to South-Carolina currency.

$\begin{array}{r} 4814\frac{2}{3} \\ 56 \\ \hline 28884 \\ 24070 \\ 16 \\ \hline 12 \overline{)2696,00} \\ 20 \overline{)224-8} \\ \hline 11 \ 4 \ 8 \end{array}$	$\begin{array}{r} 56 \\ 2 \\ \hline 7 \overline{)112} \\ 16 \end{array}$
---	--

Ans. £.11 4 8

To change Canada and Nova-Scotia currency to Federal money, the dollar being 5 shillings.

RULE. As the value of a dollar is equal to one-fourth of a pound, multiply the sum, when in pounds, by 4, for dollars.

When there are shillings, &c. reduce the given sum to pence, annex two cyphers, and divide by 60, for cents.

EXAMPLES...

1. Change £.36 Canada currency to Federal money..

36.

4.

Ans. 144 dolls..

2. Change £.528 12s. 6d. Canada currency to Federal money.

20	Or thus,	528
10572		4
12		2112
6)0)1268700)0	10 shill. =	2
211450 cts..	2s. 6d. =	0 50.
		2114 50

Ans. 2114 dolls. 50 cts.

To change Federal money to Canada and Nova-Scotia currency..

RULE. Divide the sum in dollars by 4 for pounds.

If there be dollars and cents, multiply the given sum by 60, and the product (rejecting two figures on the right) is the answer in pence.

EXAMPLES.

1. Change 144 dollars to Canada currency..

4)144.

Ans. £.36

2. Change 2114 dolls. 50 cts. to Canada or Nova-Scotia currency..

211450

60:

12)126870)00.

2)0)1057)2—6.

528 12 6

Ans. £.528 12s. 6d.

COMPOUND MULTIPLICATION.

COMPOUND MULTIPLICATION.

Is the multiplying of numbers of different denominations, by a simple figure or figures whose product shall be equal to a proposed number.

I. When the quantity does not exceed 12, multiply the price by the quantity, and the product will be the answer.

Multiply	£.191	17	8½	£.913	11	9½
by			2			5.
Ans.	£.383	15	5.	£.4567	19	0½
	£.980	19	11½	£.209	18	4½
			12			9.

1. What will 7 yards of shalloon come to at 3s. 5d. per yard?

s. d.
3 5.
7

£.1 8 11

		s.	d.	£.	s.	d.
2.	4 lb. tea	6	8	1	6	8
3.	5 bushels rye	5	9	1	8	9½
4.	6 gallons wine	7	5	2	4	6
5.	7 quintals fish	19	6	6	16	6
6.	9 cwt. iron	29	10	13	8	6
7.	11 gallons brandy	8	5	4	12	7
8.	12 quintals fish	22	10	13	14	0

II. If the number or quantity exceeds 12, and is to be found in the table, multiply by its component parts.

EXAMPLES.

	s. d.
1. 14 yards dupont at	2 5.
	2
	4 10
	7

Ans. £.1 13 10

	s.	d.		£.	s.	d.
2. 16 yards silk...at....	4	9	.....	3	16	0
3. 20 lb. coffee.....	1	9½	.....	1	15	10
4. 28 gallons rum.....	6	5½	.....	9	1	5
5. 45 cwt. iron	29	6	.....	66	7	6
6. 56 yards broadcloth	28	7	.....	80	0	8
7. 63 pair shoes.....	9	3	.....	29	2	9
8. 84 quintals fish....	18	6	.....	77	14	0
9. 100 galls. molasses ..	3	5½	.....	17	5	10
10. 121 bushels corn	4	3	.....	25	14	3
11. 144 gallons brandy --	5	7½	.....	40	13	0

To multiply by fractional parts, as $\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{3}$, &c.

RULE. Multiply the price by the upper figure of the fraction, and divide the product by the lower, the quotient will be the answer; but when the upper figure is not more than one, dividing the price or sum by the lower figure gives the answer.

EXAMPLES.

1. What is $\frac{3}{8}$ of a yard of cambric worth, at 12s. 6d. per yard?

$$\begin{array}{r} 12 \quad 6 \\ 3 \\ \hline 8)37 \quad 6 \\ \hline \text{Ans. } 4\text{s. } 8\frac{1}{2}\text{d.} \end{array}$$

2. What is $\frac{1}{2}$ of a yard of broadcloth worth, at 35s. per yard?

$$\begin{array}{r} 35 \\ 3 \\ \hline 4)105 \\ \hline \text{Ans. } 26\text{s. } 3\text{d.} \end{array} \quad \begin{array}{l} \text{Or thus, } 2)35 \\ \hline 2)17 \quad 6 \text{ price of half a yard.} \\ 8 \quad 9 \quad \text{a quarter.} \\ \hline 26 \quad 3 \end{array}$$

3. One quarter of a yard of fine linen, at 7s. 6d. per yard.

$$\begin{array}{r} 4)7 \quad 6 \\ \hline \text{Ans. } 1\text{s. } 10\frac{1}{2}\text{d.} \end{array}$$

4. Multiply £.4 5s. 3d. by $\frac{1}{3}$, or take $\frac{1}{3}$ of it.

$$\begin{array}{r} 3)4 \quad 5 \quad 3 \\ \hline \text{Ans. } £.1 \quad 8 \quad 5 \end{array}$$

COMPOUND MULTIPLICATION.

5. Multiply £.9 6s. 8d. by $\frac{7}{8}$, or take $\frac{7}{8}$ of it.

$$\begin{array}{r}
 9 \quad 6 \quad 8 \\
 7 \\
 \hline
 8)65 \quad 6 \quad 8 \\
 \hline
 \text{Ans. } \pounds.8 \quad 3 \quad 4
 \end{array}$$

III. When the number does not exceed the table, and it cannot be found in it, find the nearest to it, either less or greater; then, after having found the price of this number, add or subtract the value of so many, as it is less or greater than the given number.

EXAMPLES.

1. 37 bushels of corn, at 4s. 11d. per bushel.

$$\begin{array}{r}
 4 \quad 11 \\
 6 \\
 \hline
 1 \quad 9 \quad 6 \\
 6
 \end{array}$$

£. 17 0 price of 36 bushels.
 4 11 price of 1 bushel.

Ans. £.9 1. 11 price of 37 bushels.

	s.	d.		£.	s.	d.
2. 17½ yards shalloon..at..	2	8	Ans.	2	6	0
3. 23½ lb. coffee.....	1	10½	.....	2	4	6½
4. 57½ galls. rum.....	4	2½	.....	12	1	11½
5. 87½ yds. baize.....	2	1	.....	9	2	9½
6. 109 quintals fish.....	14	6	.....	79	0	6
7. 137½ gallons of molasses	3	8½	.....	25	6	1½

IV. When the number is above the table, find the price of each figure as in the following—

EXAMPLES.

1. 178 yards of muslin at 4s. 5d. per yard.

$$\begin{array}{r} 4 \ 5 \\ 10 \end{array}$$

$$\begin{array}{r} 2 \ 4 \ 2 \\ 10 \end{array}$$

22 1 8 price of 100 yards.
 15 9 2 price of 70
 1 15 4 price of 8

Ans. £.39 6 2 price of 178 yards.

2. $284\frac{1}{2}$ gallons of molasses, at 3s. $9\frac{1}{2}$ d. per gallon.

$$\begin{array}{r} 3 \ 9\frac{1}{2} \\ 10 \end{array}$$

$$\begin{array}{r} 1 \ 17 \ 11 \\ 10 \end{array}$$

$$\begin{array}{r} 18 \ 19 \ 2 \\ 2 \end{array}$$

37 18 4 price of 200 gallons.
 15 3 4 price of 80
 15 2 price of 4
 1 $10\frac{1}{2}$ price of $\frac{1}{2}$

Ans. £.53 18 $8\frac{1}{2}$ price of $284\frac{1}{2}$ gallons.

- | | s. | d. | | £. | s. | d. |
|---|----|----------------|------------|------------------------|----|-----------------|
| 3. 183 galls. gin....at.... | 7 | 5 |Ans... | 67 | 17 | 3 |
| 4. 345 quintals of fish.... | 23 | 9 | ..... | 409 | 13 | 9 |
| 5. 769 $\frac{3}{4}$ lb. coffee..... | 1 | 10 | ..... | 70 | 11 | $2\frac{1}{2}$ |
| 6. 809 $\frac{1}{2}$ yards baize..... | 2 | $1\frac{1}{2}$ | ..... | 86 | 0 | $2\frac{1}{2}$ |
| 7. 2375 $\frac{1}{2}$ galls. of molasses.. | 3 | $5\frac{1}{2}$ | ..... | 410 | 15 | $3\frac{1}{2}$ |
| 8. Three barrels of N. E. rum, containing 31, 32 $\frac{1}{2}$, and 33 $\frac{1}{2}$ gallons, at 4s. 7 $\frac{1}{2}$ d. per gallon. | | | Ans. | £.22 | 7 | $5\frac{1}{2}$ |
| 9. Four hogsheads of molasses, containing 97 $\frac{1}{2}$, 99 $\frac{1}{2}$, 105 $\frac{1}{2}$, and 111 $\frac{3}{4}$ gallons, at 3s. 8 $\frac{3}{4}$ d. per gallon, are delivered by A to B, to whom he owed 258 dolls. It is required to know the balance, and in whose favour it is? | | | Ans. | 4s. 1 $\frac{1}{2}$ d. | | in favour of B. |

COMPOUND MULTIPLICATION.

When the amount of a cwt. is required at a certain rate per lb.

RULE. Find the price of one or two quarters, and multiply the product by the component parts of a cwt.

1. 1 cwt. of Flour, at 3*d.* per lb.

$$\begin{array}{r}
 3 \\
 7 \\
 \hline
 19 \\
 8 \\
 \hline
 140 \text{ price of two quarters.} \\
 2
 \end{array}$$

Ans. £.1 8 0 price of one cwt.

Or by inverting the question thus,

$$\begin{array}{r}
 9 \text{ 4 the price of 112 lb. at 1d. per lb.} \\
 3
 \end{array}$$

$$\begin{array}{r}
 \text{£.1 8 0 the price of 112 lb. at 3d. per lb.} \\
 \hline
 \end{array}$$

	<i>d.</i>		£.	<i>s.</i>	<i>d.</i>
2. Two cwt. Flour....	2½	per lb.	2	6	8
3. Three .. Rice	2½	.....	3	17	0
4. Four .. Iron	3½	.....	6	1	4
5. Five .. Indigo 8s. 11½		.....	250	16	8

1. What will 4000 feet of boards come to at 38*s.* 4*d.* per thousand ?

$$\begin{array}{r}
 1 \text{ 18 } 4 \\
 4 \text{ M.}
 \end{array}$$

Ans. £.7 13 4

2. 3,596 feet of boards at 36*s.* per thousand.

$$\begin{array}{r}
 3,596 \\
 36 \\
 \hline
 21576 \\
 10788 \\
 \hline
 \text{shills. 129,456}
 \end{array}$$

Ans. £.6 9 5.

In this example three figures are pointed off as a remainder, and the fourth figure of the product of this remainder, multiplied by 12, is set down for pence.

COMPOUND MULTIPLICATION.

47

3. 853 feet of boards at 30s. per thousand.

853
30

skills. 25,590

Ans. £.1 5 7

4. 3,231 feet of 3 inch W. O. plank, 22s. £.36 6 11
5. 8,637 $2\frac{1}{2}$ 150s. 64 15 6
6. 960 2 100s. 4 16 0
7. 888 $2\frac{1}{2}$ pine, 100s. 4 8 9

Plank are sold per thousand of $2\frac{1}{2}$ inches, the usual thickness for planking vessels, and as there are generally other dimensions as 2 and 3 inches, the price of each is regulated by the price of the $2\frac{1}{2}$, adding to it, or subtracting from it, in such proportion as may be agreed on when purchasing. In the above example, taken from an actual sale, $\frac{1}{2}$ of 150s. was added to it, for the three inch, and $\frac{1}{2}$ deducted from it for the two inch, making the three inch 225s. and the two inch 100s. per thousand.

WEIGHTS AND MEASURES.

	lb.	oz.	dwt.	grs.	lb.	oz.	dwt.	grs.
Multiply	14	9	14	17	825	8	19	22
by			5				8	
Product	74	0	13	13	6605	11	19	8

T.	cwt.	qrs.	lb.	Cwt.	qr.	lb.	oz.	drs.
19	17	3	25	17	1	14	11	14
		9					7	

T.	hhd.	gal.	T.	p.	hhd.	gal.
87	1	57	28	1	1	62
	5				7	

What is the weight of 47 casks of rice, each weighing 2C. 1qr. 23lb. ?

Ans. 115 cwt. 1 qr. 17 lb.

COMPOUND MULTIPLICATION.

BILLS OF PARCELS.

*Boston, June 28, 1804.**Mr. GEORGE ROWE bought of WILLIAM RUSSELL,*

	s.	d.	
8 pair worsted hose.....at.....4	6	.....	£.1 16 0
5 do. thread do.....3	2	.....	0 15 10
3 yards kerseymere.....14	0	.....	2 2 0
6 do. muslin.....4	2	.....	1 5 0
2 do. tammy.....1	8	.....	0 3 4
4 shawls.....7	6	.....	1 10 0
			<hr/>
			£.7 12 2

25 dols. 36 cts.

*Portsmouth, 19th May, 1804.**Mr. THOMAS BARRINGTON**Bought of SIMON WILSON,*

1½ lb. Tea.....4s.6	.....	£.0 7 10½
4½ bushels corn.....5s.4	.....
5 quarts brandy.....8s.4	per gallon	.....
6 do. rum.....7s.6	do.	.....
7½ yards chintz.....2s.5	.....
		<hr/>
		£.3 11 0½

11 dols. 84½ cts.

*Salem, 23d May, 1804.**Mr. AMOS GILES**Bought of LEMUEL KING,*

10 boys' coloured hats, No. 1, at 4s.6	.....	£.2 5 0
12 .....do.....2, .. 5s.	.....
4 .....do.....3, .. 5s.6	.....
4 .....do.....9, .. 10s.	.....
4 .....do.....10, .. 11s.	.....
6 .....do.....11, .. 12s.	.....
6 men's plain black do. 12, .. 14s.	.....
		<hr/>
		£.18 7 0

Trunk.....1 4 0

£.19 11 0

65 dols. 16½ cts.

COMPOUND DIVISION.

49

Mr. NATHAN PERKINS *Boston, 10th August, 1803.*

Bought of **GEORGE ALLEN,**

64½ yds. striped nankins..at.. 2s. £.6 9 0
 32 ells mode 3s.
 28½ yds. calico 2s.4.....
 2 groce gilt coat buttons....18s.6.....
 3 pieces russel34s.

£.21 10 6.

71 dols. 75 cts.

Mr. WILLIAM SANDS *Newburyport, Sept. 10, 1803.*

Bought of **STEPHEN NOWLAN,**

2 pieces muslin30s.£.3 0 0
 25 yards Irish linen 2s.
 28½ do. stormount calico..... 2s.6.....
 28½ do. .. red do. 2s.2.....
 1 piece durant.....56s.
 2 pieces blue shalloon.....57s.6.....
 50½ yards dimity 2s.6.....
 3 pieces persian84s.

£.39 12 3

132 dols. 4 cts.

Received payment by his note of the above date, at three months.

For Stephen Nowlan,

ABRAHAM TRUSTY.

COMPOUND DIVISION

Teacheth to find how often one number is contained in another of different denominations.

EXAMPLES.

1. Divide £.19 14s. 9½d. by 2.

2)19 14 9½

Ans. £.9 17 4½

2. Divide £.900 11 9¾, by 3. Ans. £.300 3 11½

Prove this answer to be right.

E

COMPOUND DIVISION.

3. Divide £.121 7s. 9½d. by 5. Ans. £.24 5s. 6¾d.
 4. Divide £.248 9s. 1½d. by 9. Ans. £.27 12s. 1½d.
 5. Divide £.1057 1s. 3d. by 12. Ans. £.88 1s. 9½d.
 II. If the divisor exceeds 12, and it be found in the table,
 divide by its component parts.

EXAMPLES.

1. Divide £.278 8s. 9d. between 45 men equally.

$$\begin{array}{r} 5 \overline{)278 \ 8 \ 9} \end{array}$$

$$\begin{array}{r} 9 \overline{)55 \ 13 \ 9} \end{array}$$

Ans. £.6 3 9 each.

2. If 20 lb. of indigo cost £.7 5s. 10d. what is it per lb.?

Ans. 7s. 3½d.

3. If 24 yards of durant cost 62s. 6d. what is it per yard?

Ans. 2s. 7½d.

4. If 72 bushels of corn cost £.20 9s. 6d. what is it per bushel?

Ans. 5s. 8½d.

5. If 108 lb. of tea cost £.45 13s. 6d. what is one pound worth?

Ans. 8s. 5½d.

6. When £.166 13s. 4d. is paid for 500 gallons of rum, what is it per gallon?

Ans. 6s. 8d.

7. If 1000 gallons of molasses cost £.209 7s. 6d. what is it per gallon?

Ans. 4s. 2½d.

- III. If the divisor cannot be found by the multiplication of small numbers, as the preceding examples, divide by it as in the following

EXAMPLES.

1. Divide £.46 1s. 11d. by 37.

£. s. d.

$$37 \overline{)46 \ 1 \ 11(1 \ 4 \ 11 \text{ Ans.}}$$

37

9

20

$$37 \overline{)181(4}$$

148

33

12

$$37 \overline{)407(11}$$

37

37

37

2. Divide £.33 13s. 8½d. by 23. Ans. £.1 9 3½.

3. If 345 quintals of fish cost £.409 13s. 9d. how much is it per quintal ? Ans. 23s. 9d.

Dividing by fractional parts, as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{4}{5}$, &c. is the same as multiplying by them. See the Rule under Case II. in Compound Multiplication.

1. How much is $\frac{2}{3}$ of £.91 11s. 3d.

91 11 3 Or thus 2)91 11 3

4)274 13 9

2)45 15 7½ one half the sum.
22 17 9½ one quarter.

Ans. £.68 13 5½

£.68 13 5½ answer.

2. Divide £.126 19s. 5½d. by $\frac{4}{5}$. Ans. £.101 11 7

3. If the whole of a ship is worth £.960 what is $\frac{5}{8}$ worth ? Ans. £.600

4. If $\frac{3}{4}$ of a ship was sold for £.1056 2s. 1d. what was the whole valued at ? Ans. £.1689 15 4

IV. Having the price of a hundred weight, to know how much it is per pound.

RULE. FIND the price of 1 or 2 quarters, and then divide by the component parts.

1. If 1 cwt. of steel cost £.4. 6s. 4d. what is it per lb. ?

4)4 6 4 Or thus 2)4 6 4

4)1 1 7 price of 1 qr. 7)2 3 2 price of 2 quarters.

7)0 5 4½

8)0 6 2

Ans. 0 0 9½ per lb.

0 0 9½ per lb.

2. If 1 cwt. of flour cost 23s. 4d. what is it per lb. ?

Ans. 2½d.

3. When 2 cwt. of sugar cost £.8 17s. 4d. what is it per lb. ? Ans. 9½d.

4. If 5 cwt. of iron cost £.8 15s. 0d. how much is it per lb. ? Ans. 3¾d.

1. A mate and 3 seamen have to receive 600 dollars, for recapturing their vessel, of which the mate is to have two shares, and each seaman one share ; how much is the part of each ?

Ans.—The mate's part is 240 dols.

and each seaman's 120.

2. Capt. M. of the Jason, meets at sea with the wreck of the Hawk, of Boston, from which he takes sundry articles, which sell for 521 dollars 64 cents : two-thirds of this sum is awarded to the owners of the Hawk ; of the other $\frac{1}{3}$ the owners of the Jason are to have $\frac{1}{2}$, and the remainder is to be divided between the captain, mate, and nine seamen, allowing the captain 3 shares, the mate 2, and the seamen 1 share each; what is the respective part of those concerned ?

	dols.	cts.
Ans.—The owners of the Hawk	347	76
owners of the Jason	86	94
captain.....	18	63
mate.....	12	42
each seaman.....	6	21

.....

DECIMAL FRACTIONS.

A DECIMAL FRACTION is that, whose denominator is an unit, with as many cyphers annexed to it as the numerator has places, and is usually expressed by writing the numerator only, with a point before it, called the separatrix ; thus, $\frac{5}{10}$, $\frac{25}{100}$, $\frac{125}{1000}$, are decimal fractions, and are expressed by ,5 ,25 ,125 respectively.

The figures to the left hand of the separatrix are whole numbers ; thus 4,5 yards is 4 yards and 5 tenths, or one half of another yard.

Cyphers placed to the right hand of decimals, make no alteration in their value ; for ,5 ,50 ,500 &c. are decimals of the same value, being each equal to $\frac{1}{2}$; but when placed to the left hand, the value of the fraction is decreased in a tenfold proportion ; thus ,5 ,05 ,005 &c. are 5 tenth parts, 5 hundredth parts, 5 thousandth parts, respectively.

Required the sum of twenty-nine and three tenths, three hundred and seventy-four and nine millionths, ninety-seven and two hundred and fifty-three thousandths, three hundred and fifteen and four hundredths, twenty-seven, one hundred and four tenths.

Ans. 942,993009.

Required the sum of ten dollars and twenty-nine cents, ninety-three cents and three mills, nine cents and six mills, and two dollars and eight mills.

Ans. 13 dols. 32 cts. 7 mills.

...

SUBTRACTION OF DECIMALS.

RULE. Place the given numbers so that the decimal points may stand directly under each other, and then point off the decimal places as in addition.

EXAMPLES.

From 219,42	87,26	57	311
Take 184,38	19,4	9,375	11,11
<hr/> 35,04	<hr/> 67,86	<hr/> 47,625	<hr/> 299,89

From two thousand and sixteen hundredths take one thousand and four, and four millionths.

Ans. 996,159996.

From twenty-four thousand nine hundred and nine and one-tenth take fourteen thousand and twenty-nine thousandths.

Ans. 10909,071.

Take eighty-five and seven hundred and thirty-seven thousandths from one hundred.

Ans. 14,263.

From five hundred and thirty-one dollars two cents take one hundred and seventeen dollars three cents and four mills.

Ans. 413 dols. 98 cts. 6 m.

MULTIPLICATION OF DECIMALS.

Multiply exactly as in whole numbers, and from the product cut off as many figures for decimals to the right hand as there are decimals in both the factors, but if the product should not have so many, supply the defect by prefixing cyphers.

DECIMAL FRACTIONS.

55

EXAMPLES.

Multiply	36,5	29,831	3,92
by	7,27	,952	196
	<hr/>	<hr/>	<hr/>
	2555	59662	2352
	730	149155	3528
	<hr/>	<hr/>	<hr/>
	2555	268479	392
Product	<hr/>	<hr/>	<hr/>
	265,355	28,399112	768,32
	<hr/>	<hr/>	<hr/>
Multiply	,285	,285	,29
by	,8	,008	,1
	<hr/>	<hr/>	<hr/>
Product	,2280	,000855	,029
	<hr/>	<hr/>	<hr/>

NOTE. To multiply decimal fractions by 10, 100, 1000, &c. is only to remove the separatrix so many places towards the right as there are cyphers.

Thus, 7,362937 $\left\{ \begin{array}{l} 10 \\ 100 \\ 1000 \\ 10000 \end{array} \right\}$ is $\left\{ \begin{array}{l} 73,62937 \\ 736,2937 \\ 7362,937 \\ 73629,37 \end{array} \right.$

Multiply twenty-nine and three tenths by seventeen.

Ans. 498,1.

Multiply twenty-seven thousandths by four hundredths.

Ans. ,00108.

Multiply two thousand and four and two tenths by twenty-seven.

Ans. 54113,4.

PRACTICAL QUESTIONS.

1. How much will 93 yards of shalloon come to at 53 cents per yard?

$$\begin{array}{r} 93 \\ ,53 \\ \hline 279 \\ 465 \\ \hline 49,29 \end{array}$$

Ans. 49 dolls. 29 cents.

2. At 21 cents 9 mills per lb. what will 187 lb. of coffee come to?

Ans. 40 dols. 95 cents 3 mills.

3. What will 27 cwt. of iron come to at 4 dollars 56 cents per cwt. ? Ans. 123 dols. 12 cents.
 4. How much will 281 yards of tape come to at 9 mills per yard ? Ans. 2 dols. 52 cents 9 mills.
 5. What will 371 yards of broadcloth come to at 5 dols. 79 cents per yard ? Ans. 2148 dols. 9 cents.
 6. How much will 29½ yards of mode come to at 75 cents per yard ? Ans. 22 dols. 12 cents 5 mills.
 7. What will 23,625 feet of boards come to at 8 dollars 25 cents per M. ?

$$\begin{array}{r}
 23,625 \\
 8,25 \\
 \hline
 118125 \\
 - 47250 \\
 \hline
 189000
 \end{array}$$

- 194,90625 Ans. 194 dols. 90 cents 6 mills.
 8. How much will 712 feet of boards come to at 14 dollars per thousand ? Ans. 9 dols. 96 cents 8 mills.
 9. What will 25,650 feet of clear boards come to at 17 dols. 50 cents per thousand ? Ans. 448 dols. 87 cents 5 mills.

		Dols. Cts.		Dols. Cts. M.
10.	15,859 feet clear boards	17 50 per M.		277 53 2
11.	812	do... 14		11 36 8
12.	376	do... 12 75		4 79 4
13.	31,496 merchantable	do... 8		251 96 8
14.	269	do... 6 75		1 81 5
15.	4,114 refuse	do... 3 37		13 86 4
16.	393 maple	do... 8 per foot		31 44
17.	57 mahogany	32 do.		18 24
18.	195 gallons molasses	57 per gall.		111 15
19.	189 do. rum	93		175 77
20.	243 yards baize	23 per yard		55 89
21.	197 feet clear boards	2 per foot		3 94

DIVISION OF DECIMALS.

RULE. Divide as in whole numbers, and from the right hand of the quotient point off as many places for decimals as the decimal places in the dividend exceed those of the divisor. If the places of the quotient are not so many as the rule requires, supply the defect by prefixing cyphers. If at any time there be a remainder, or the decimal places in the divisor are

more than those in the dividend, cyphers may be annexed to the dividend, and the quotient carried to any degree of exactness.

EXAMPLES.

$ \begin{array}{r} 92 \overline{) 863972} \quad (009391 \\ \underline{828} \\ 359 \\ \underline{276} \\ 837 \\ \underline{828} \\ 92 \\ \underline{92} \\ \hline \end{array} $	$ \begin{array}{r} ,853 \overline{) 89,000} \quad (104,337, \&c. \\ \underline{853} \\ 3700 \\ \underline{3412} \\ 2880 \\ \underline{2559} \\ 3210 \\ \underline{2559} \\ 6510 \\ \underline{5971} \\ 539 \end{array} $
--	--

The various kinds that ever occur in division are included in the following cases, viz.

Divide ,803	by ,22	Ans. 3,65
,803	2,2	,365
,803	22	,0365
80,3	,22	365
80,3	2,2	36,5
80,3	22	3,65
222	,365	608,21 +
222	3,65	60,821 +
222	365	,60821 +

As multiplying by 10, 100, 1000, &c. is only removing the separating point of the multiplicand so many places to the right hand as there are cyphers in the multiplier, so to divide by the same, is only removing the separator, in the same manner, to the left.

PRACTICAL QUESTIONS.

1. When butter is sold at 12 cents 8 mills per lb. how many lb. may be bought for 224 dollars ?

,128)224,000(1750

128

960

896

640

640

Ans. 1750lb.

Here the cyphers annexed to the dividend being equal to the decimal places in the divisor, the quotient is a whole number.

2. If 673 bushels of wheat cost 786 dols. 73 cents 7 mills, what is it per bushel ?

673)786,737(1,169

673

1137

673

4643

4038

6057

6057

Ans. 1 dol. 16 cts. 9 mills.

In this example, as the divisor is a whole number, three places are pointed off in the quotient, to equal those in the dividend.

3. If 493 yards cost 4 dols. 43 cents 7 mills, what is it per yard ?

Ans. 9 mills.

4. If 125 gallons of molasses cost 95 dollars, what is 1 gallon worth ?

Ans. 76 cents.

5. If 205 yards of durant cost 107 dollars 62½ cents, what is it per yard ?

Ans. 52½ cents.

REDUCTION OF DECIMALS.

CASE I.

To reduce a vulgar fraction to its equivalent decimal.

RULE. Divide the numerator by the denominator, and the quotient will be the decimal required.

EXAMPLES.

1. Reduce $\frac{3}{4}$ to a decimal.

$$\begin{array}{r} 4 \overline{)3,00} \end{array}$$

Ans. ,75

2. What is the decimal of $\frac{1}{2}$?

Ans. ,5

3. What is the decimal of $\frac{1}{4}$?

Ans. ,25

4. What is the decimal of $\frac{3}{20}$?

Ans. ,15

5. What is the decimal of $\frac{17}{25}$?

Ans. ,68

6. Express $\frac{7}{8}$ decimally.

Ans. ,875

CASE II.

To reduce numbers of different denominations to their equivalent decimal values.

RULE. 1. Write the given numbers perpendicularly under one another for dividends, proceeding orderly from the least to the greatest.

2. Opposite to each dividend, on the left hand, place such a number for a divisor as will bring it to the next superior name, and draw a line between them.

3. Begin with the highest, and write the quotient of each division, as decimal parts, on the right hand of the dividend next below it, and the last quotient will be the decimal sought.

EXAMPLES.

1. Reduce 14s. 5 $\frac{1}{2}$ d. to the decimal of a pound.

$$\begin{array}{r|l} 4 & 2 \\ 12 & 5,5 \\ 20 & 14,4583 \end{array}$$

Ans. ,7229

2. Reduce 15 shillings to the decimal of a pound. Ans. ,75

3. Reduce 3 qrs. 18lb. to the decimal of a cwt.

Ans. ,910714 +

4. Reduce 2 qrs. 2 nails to the decimal of a yard. Ans. ,625

5. Reduce 14 gals. 3 quarts to the decimal of a hoghead.

Ans. ,2341 +

CASE III.

To find the decimal of any number of shillings, pence and farthings, by inspection.

RULE. Write half the greatest even number of shillings for the first decimal figure, and let the farthings, in the given pence and farthings, possess the second and third places; observing to increase the second place by 5, if the shillings be odd, and the third place by 1, when the farthings exceed 12, and by 2 when they exceed 37.

EXAMPLES.

1. Find the decimal of 13s. 9½d. by inspection.

6 half of 12s.
5 for the odd shilling.
39 farthings in 9½d.
2 for excess of 37

691

2. Find by inspection the decimal of 15s. 8½d. 9s. 3½d. 19s. 6½d. 3s. 6d. and 2s. 11½d. Ans. ,784 ,465 ,978 ,175 ,148.

CASE IV.

To find the value of any given decimal in the terms of the integer.

RULE. 1. Multiply the decimal by the number of parts in the next less denomination, and cut off as many places for the remainder to the right hand as there are places in the given decimal.

2. Multiply the remainder by the parts in the next inferior denomination, and cut off a remainder as before.

3. Proceed in this manner through all the parts of the integer, and the several denominations, standing on the left hand make the answer.

EXAMPLES.

1. Find the value of ,691 of a pound.

691
20

13,820
12

9,840
4

3,360

Ans. 13s. 9½d.

2. What is the value of ,9 of a shilling? Ans. 10½d.

3. What is the value of ,592 of a cwt.?

Ans. 2 qrs. 10 lb. 4 oz. 13 + drs.

4. What is the value of ,258 of a tun of wine?

Ans. 1 hhd. 2 + galls.

5. What is the value of ,12785 of a year?

Ans. 46 days 15 hours 57 minutes 57 + sec.

DECIMAL TABLES OF COIN, WEIGHT AND MEASURE.

TABLE I.

ENGLISH COIN.

1l. the Integer.

Sh.	dec.	Sh.	dec.
19	,95	9	,45
18	,9	8	,4
17	,85	7	,35
16	,8	6	,3
15	,75	5	,25
14	,7	4	,2
13	,65	3	,15
12	,6	2	,1
11	,55	1	,05
10	,5		

Pence.	Decimals.
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Farth.	Decimals.
3	,003125
2	,0020833
1	,0010416

TABLE II.

ENG. COIN. 1 Shill.

LONG MEAS. 1 Foot.

The Integer.

Pence and Inches.	Decimals.
6	,5
5	,416666
4	,333333
3	,25
2	,166666
1	,083333

Farth.	Decimals.
3	,0625
2	,041666
1	,020833

TABLE III.

TROY WEIGHT.

1 lb. the Integer.

Ounces the same as Pence in the last Table.

Penny weight.	Decimals.
10	,041666
9	,0375
8	,033333
7	,029166
6	,025
5	,020833
4	,016666
3	,0125
2	,008333
1	,004166

Grains.	Decimals.
12	,002083
11	,001910
10	,001736
9	,001562
8	,001389
7	,001215
6	,001042
5	,000868
4	,000694
3	,000521
2	,000347
1	,000173

1 oz. the Integer.

Pennyweight the same as Shillings in the first Table.

Grains.	Decimals.
12	,025
11	,022916
10	,020833
9	,01875
8	,016666
7	,014583

Grains.	Decimals.
6	,0125
5	,010416
4	,008333
3	,00625
2	,004166
1	,002083

TABLE IV.

AVOIRDUPOIS WT.

112 lb. the Integer.

Qrs.	Decimals.
3	,75
2	,5
1	,25

Pounds	Decimals.
14	,125
13	,116071
12	,107143
11	,098214
10	,089286
9	,080357
8	,071428
7	,0625
6	,053571
5	,044643
4	,035714
3	,026786
2	,017857
1	,008928

Ounces	Decimals.
8	,004464
7	,003906
6	,003348
5	,002790
4	,002232
3	,001674
2	,001116
1	,000558

$\frac{1}{4}$ oz.	Decimals.
3	,000418
2	,000279
1	,000139

DECIMAL TABLES OF COIN, WEIGHT AND MEASURE.

TABLE V.
AVOIRDUPOIS WT.
1 lb. the Integer.

Oz.	Decimals.
8	,5
7	,4375
6	,375
5	,3125
4	,25
3	,1875
2	,115
1	,0625

Drm.	Decimals.
8	,03125
7	,027343
6	,023437
5	,019531
4	,015625
3	,011718
2	,007812
1	,003906

TABLE VI.
LIQUID MEASURE.
1 Tun the Integer.

Gals.	Decimals.
100	,396825
90	,357141
80	,317460
70	,27
60	,238095
50	,198412
40	,158730
30	,119047
20	,079365
10	,039682
9	,035714
8	,031746
7	,027
6	,023809

Gals.	Decimals.
5	,019841
4	,015873
3	,011904
2	,007936
1	,003968

Pints.	Decimals.
4	,001984
3	,001488
2	,000992
1	,000496

A hogshead the Integer.

Gals.	Decimals.
30	,476190
20	,317460
10	,158730
9	,142857
8	,126984
7	,111111
6	,095238
5	,079365
4	,063492
3	,047619
2	,031746
1	,015873

Pints.	Decimals.
3	,005952
2	,003968
1	,001684

TABLE VII.
MEASURE.
Liquid. Dry.
1 Gallon. 1 Quarter.
Integer.

Pt.	Decim.	Bu.
4	,5	4
3	,375	3

Pt.	Decim.	Bu.
2	,25	2
1	,125	1

Q.pt.	Decim.	Pk.
3	,09375	3
2	,0625	2
1	,03125	1

Decimals.	Q. pks.
,0234375	3
,015625	2
,0078125	1

Decimals.	Pts.
,005859	3
,003906	2
,001953	1

TABLE VIII.
LONG MEASURE.
1 Mile the Integer.

Yards.	Decimals.
1000	,568182
900	,511364
800	,454545
700	,397727
600	,340909
500	,284091
400	,227272
300	,170454
200	,113636
100	,056818
90	,051136
80	,045454
70	,039773
60	,034091
50	,028409
40	,022727
30	,017045
20	,011364
10	,005682
9	,005114

DECIMAL TABLES OF COIN, WEIGHT AND MEASURE.

<i>Yards.</i>	<i>Decimals.</i>	<i>Days.</i>	<i>Decimals.</i>
8	,004545	8	,021918
7	,003977	7	,019178
6	,003409	6	,016438
5	,002841	5	,013698
4	,002273	4	,010959
3	,001704	3	,008219
2	,001139	2	,005479
1	,000568	1	,002739

<i>Feet.</i>	<i>Decimals.</i>
2	,0003787
1	,0001894

<i>Inches.</i>	<i>Decimals.</i>
6	,0000947
5	,000079
4	,0000631
3	,0000474
2	,0000319
1	,0000158

TABLE IX.

TIME.

1 Year the Integer.

Months the same as
Pence in the second
Table.

<i>Days.</i>	<i>Decimals.</i>
365	1,000000
300	,821918
200	,547945
100	,273973
90	,246575
80	,219178
70	,191781
60	,164383
50	,136986
40	,109589
30	,082192
20	,054794
10	,027397
9	,024657

1 Day the Integer.

<i>Hours.</i>	<i>Decimals.</i>
12	,5
11	,458333
10	,416666
9	,375
8	,333333
7	,291666
6	,25
5	,208333
4	,166666
3	,125
2	,083333
1	,041666

<i>Minutes.</i>	<i>Decimals.</i>
30	,020833
20	,013888
10	,006944
9	,00625
8	,005555
7	,004861
6	,004166
5	,003472
4	,002777
3	,002083
2	,001388
1	,000694

TABLE X.

CLOTH MEASURE.

1 Yard the Integer.

Quarters the same as
Table IV.

<i>Nails.</i>	<i>Decimals.</i>
2	,125
1	,0625

TABLE XI.

LEAD WEIGHT.

1 Fother the Integer.

<i>Hand.</i>	<i>Decimals.</i>
10	,512820
9	,461538
8	,410256
7	,358974
6	,307692
5	,256410
4	,205128
3	,153846
2	,102564
1	,051282

<i>Qrs.</i>	<i>Decimals.</i>
2	,025641
1	,012820

<i>Pounds.</i>	<i>Decimals.</i>
14	,0064102
13	,0059523
12	,0054945
11	,0050366
10	,0045787
9	,0041208
8	,0036630
7	,0032051
6	,0027472
5	,0022893
4	,0018315
3	,0013736
2	,0009157
1	,0004578

The Single Rule of Three Direct.

THE Single Rule of Three Direct teaches, from three numbers given, to find a fourth, that shall be in the same proportion to the third as the second is to the first.

If *more* requires *more*, or *less* requires *less*, the proportion is direct.

RULE 1. Make the number that is the demand of the question, the third term, the number that is of the same name or quality, the first term, and the remaining number will be the middle term.

Reduce the first and third numbers into the same, and the second into the lowest denomination mentioned.

2. Multiply the second and third numbers together, and divide the product by the first, and the quotient (if there be no remainder) is the answer, or fourth number required.

If, after division there be a remainder, reduce it to the next denomination below that to which the second number was reduced, and divide by the same divisor as before, and the quotient will be of this last denomination. Proceed thus with all the remainders till you have reduced them to the lowest denomination, which the second number admits of, and the several quotients taken together will be the answer required.

The method of proof is by reversing the question.

EXAMPLES.

1. If 2 yards of cloth cost 4s. what will 125 yards come to?

$$\begin{array}{rcl}
 \text{yds.} & \text{s.} & \text{yds.} \\
 \text{If } 2 & : 4 :: 125 \\
 & & 4 \\
 \hline
 & & 2)500 \\
 \hline
 & & 20)250
 \end{array}$$

Ans. £.12 10

$$\begin{array}{rcl}
 \text{yds.} & \text{£.} & \text{s.} & \text{yds.} \\
 \text{Proof if } 125 & : 12 & 10 :: 2 \\
 & & 20 \\
 \hline
 & & 250 \\
 & & 2 \\
 \hline
 & & 125)500(4 \text{ shillings.} \\
 & & 500 \\
 \hline
 \end{array}$$

SINGLE RULE OF THREE DIRECT.

63

2. If 1 bushel of corn cost 75 cents, what will 257 bushels come to?

$$\begin{array}{rcl} \text{bush.} & \text{cts.} & \text{bush.} \\ \text{If } 1 & : 75 & :: 257 \\ & & 75 \end{array}$$

$$\begin{array}{r} 1285 \\ 1799 \\ \hline \end{array}$$

192,75 Ans, 192 dols. 75 cts.

3. What will 931 yards of shalloon come to at 55 cts. 4 ms. per yard?

Ans. 515 dols. 77 cts. 4 ms.

4. How many bushels of wheat at 1 dol. 12 cts. per bushel can I have for 81 dols. 76 cts.?

Ans. 73 bushels.

5. What will 94 twt. of iron come to at 4 dols. 97 cts. 2 ms. per cwt.?

Ans. 467 dols. 36 cts. 8 ms.

6. What will 349 lbs. of beef come to at 2d. per lb.?

Ans. £.2 18 2

7. At 3d. per yard what will 59 yards of cloth come to?

Ans. £.8 17 0

Prove this answer to be right.

8. How many lbs. of beef at 5 cts. per lb. may be bought for 29 dols. 85 cts.?

$$\begin{array}{rcl} \text{cts.} & \text{lb.} & \text{dols. cts.} \\ \text{If } 5 & : 1 & :: 29,85 \\ & & 1. \end{array}$$

$$\begin{array}{r} 05)29,85 \\ \hline \end{array}$$

597

Ans. 597 lb.

9. How many hhd. of salt at 4 dols. 90 cts. per hhd. can I have for 392 dols.?

Ans. 80 hhd.

10. How many lbs. of coffee, at 1s. 7d. per lb. may be bought for £.8 12 7?

Ans. 109 lb.

SINGLE RULE OF THREE DIRECT.

11. When 25 yds. of cloth cost £.2 12 1, what is it per yd.?

yd. £. s. d. yd.
If 25 : 2 12 1 :: 1

$$\begin{array}{r}
 20 \\
 \hline
 52 \\
 12 \\
 \hline
 625 \\
 1 \\
 \hline
 25 \overline{)625(12 \mid 25} \\
 \underline{50} \\
 125 \\
 \underline{125} \\
 0
 \end{array}$$

2s. 1d.

Ans. 2s. 1d.

12. If 56 bushels of corn cost 42 dols. 56 cts. what is it per bushel?

bush. dols. cts. bush.
If 56 : 42,56 :: 1

$$\begin{array}{r}
 1 \\
 \hline
 56 \overline{)42,56(76} \\
 \underline{392} \\
 336 \\
 \underline{336} \\
 0
 \end{array}$$

Ans. 76 cts.

13. If 112 lbs. of beef cost 18s. 8d. what is it per lb.?

Ans. 2 pence.

14. If 673 bushels of rye cost 769 dols. 23 cts. 9 ms. what is 1 bushel worth?

Ans. 1 dol. 14 cts. 3 ms.

15. What is 1 yard of baize worth, when 97 yards cost £.10 12s. 2½d.

Ans. 2s. 2½d.

16. When iron is sold at 5 dols. 4 cts. per cwt. what is it per pound?

Ans. 4 cts. 5 ms.

17. If 891 gallons of molasses cost £.176 6s. 10½d. what is it per gallon?

Ans. 3s. 11½d.

Prove this answer to be right.

18. What will 253 quintals of fish come to, at 17s. 6d. per quintal?

Ans. £.221 7. 6

19. At 5 dols. 50 cts. per thousand, what will 37 thousand of boards come to ? Ans. 203 dols. 50 cts.

20. What will 4 hhds. of rum come to, containing viz. 79½, 84, 101½, and 112 gals. at 6s. 9d. per gal. ? Ans. £.127 4 9.

21. What will 327 hhds. of salt come to, at 5 dols. 25 cts. per hhd. ? Ans. 1716 dols. 75 cts.

22. If 3 and 4 make 9, how many will 6 and 8 make ? Ans. 18

23. If a chest of Hyson tea, weighing 79 lb. neat, cost £.32 11s. 9d. what is it per lb. ? Ans. 8s. 3d.

24. B owes £.2119 17s. 6d. and he is worth but £.1324 18s. 5½d.; if he delivers this to his creditors, how much do they receive on the pound ? Ans. 12s. 6d.

25. A owes B £.569 6s. 8d. but failing in trade, he is able to pay but 15s. 6d. on the pound ; how much is B to receive, and what is his loss ? Ans.—He is to receive £.441 4 8.
His loss is 128 2 0

26. A merchant failing in trade, owes in all 29475 dols. and delivers up his whole property, worth 21894 dols. 3 cts. ; how much per cent. does he pay, and what is B's loss, to whom he owed 325 dols. ? Ans.—He pays 74 dols. 28 cts. per cent.
And B loses 83 dols. 59 cts.

27. How much will 4 cwt. 1 qr. 19 lb. of butter come to, at 9d. per lb. ?

$$\begin{aligned} & \text{lb.} \\ 400 &= 4 \text{ hundred.} \\ 48 &= \text{excess, 12 per cent.} \\ 28 &= 1 \text{ quarter.} \\ & 19 \end{aligned}$$

$$\begin{array}{rcl} \text{lb.} & \text{d.} & \\ 1 & : & 9 \\ \hline & & 495 \end{array}$$

$$12)4455.$$

$$20)371 \quad 3$$

Ans. £.18 11s. 3d.

28. If 3 qrs. 26 lb. of steel cost 13 dols. 20 cts. what is it per pound ? Ans. 12 cents.

68 SINGLE RULE OF THREE DIRECT.

29. If 16 cwt. 3 qrs. of steel cost 157 dols. 45 cts. what is 1 qr. worth ?

Ans. 2 dols. 35 cts.

Prove this answer to be right.

30. A captain of a ship is provided with 18000 lb. of bread for 150 seamen, of which each man eats 4 lb. per week, how long will it last them ?

Ans. 30 weeks.

31. How long would 2295 lb. of beef last for 45 seamen, if they get 1 lb. each, and that three times a week ?

Ans. 17 weeks.

32. Suppose 120 seamen are provided with 7200 gallons of water for a cruise of 4 months, each month 30 days ; how much is each man's share per day ?

Ans. 2 quarts.

33. A ship's company of 16 men is on an allowance of 6 ounces of bread per day, when meeting with a vessel from which they are supplied with 2 cwt. of bread, what addition will this make to their daily allowance, if they suppose their voyage to last 28 days ?

Ans. 8 ounces.

34. If 17 tuns 2 hhds. of wine cost 5468 dols. 40 cts. how much is one pint worth ?

Ans. 15 cts. 5 ms.

35. How much will 4 pieces of linen, containing, viz. 35½, 36, 37½, and 38 yards come to, at 79 cts. per yard ?

Ans. 116 dols. 13 cts.

36. How many crowns of 110 cents each will pay a debt of £.82 16s. 7d. ?

Ans. 251 crowns.

37. If 203 tons 9 cwt. 3 qrs. 3 lb. of tallow cost £.4558 3s. 0d. what does 1 ton cost ?

Ans. £.22 8 0

38. How many cwt. of rice may be bought for 487 dols. 50 cts. when 7 lb. cost 25 cents ?

Ans. 121 cwt. 3 qrs. 14 lb.

39. When 9 dols. 36 cts. is paid for 2 qrs. 22 lb. of sugar, what is 7 lb. worth ?

Ans. 84 cents.

40. When 47 cwt. 3 qrs. of sugar cost £.182 4s. 11d. what is 1 qr. worth ?

Ans. 19s. 1d.

41. If 6 lb. 6 oz. Avoirdupois cost 5 dols. 10 cts. what is it per ounce ?

Ans. 5 cents.

42. Bought 40 tubs of butter weighing 36 cwt. 2 qrs. 14 lb. neat, for 472 dols. 2 cts. ; paid cooperage 12 cts. per tub ; salt and labour 4 dols. 83 cts. 8 mills ; storage 6 dols. 48 cts. — I would know what it stands me in per lb. ?

Ans. 11 cts. 9 ms.

43. How much will a grindstone, 32 inches diameter, and 6 inches thick, come to, at 5s. per cubic foot ?

See Reduction, } 32 the diameter.
cubic measure. } 16 = half the diameter.

48
16
—
288
48
—
768
6

If $\begin{matrix} \text{inch.} & & \text{s.} \end{matrix}$ 1728 : 5 :: $\begin{matrix} \text{s.} & \text{d.} \end{matrix}$ 4608 : 13 4 Ans. 13s. 4d.

44. What will a grindstone, 28 inches diameter, and 3½ inches thick, come to, at 1 dol. 90 cts. per cubic foot ?

Ans. 2 dols. 26 cts.

45. When a man's yearly income is 949 dollars, how much is it per day ?

Ans. 2 dols. 60 cts.

46. At 4½ per cent. what is the commission on 1525 dols. ?

Ans. 68 dols. 62 cts. 5 ms.

47. What is the interest of 456 dollars for 1 year, at 6 per cent. ?

Ans. 27 dols. 36 cts.

48. At 5 dols. 50 cts. per M. what will 21,186 feet boards come to ?

Ans. 116 dols. 52 cts. 3 ms.

49. When boards are sold at 18 dols. per M. what is it per foot ?

Ans. 1 cent, 8 mills.

50. What will 98 feet of boards come to at 4 cts. per foot ?

Ans. 3 dols. 92 cts.

51. What will 49 thousand 3 hundred and 25 casts of staves come to at 17 dols. per thousand ?

NOTE. Staves are counted by casting three at a time ; 40 casts make 1 hundred, and 10 hundred 1 thousand.

M.	dols.	M.	h.	c.
If 1	: 17	::	49 3	25
10			10	
—			—	
10			493	
40			40	
—			—	
Casts 400			19745	
				dols. cts. m.
				Ans. 839 16 3

52. What will 19 M. 8 and 15 casts of white oak hhd. staves come to, at 31 dols. per M. ?

Ans. 614 dols. 96 cts. 2 ms.

53. What will 22 M. 9 and 37 casts of red oak hhd. staves come to, at 13 dols. per M. ? Ans. 298 dols. 90 cts. 2 ms.

54. What will 56 bundles of hoops come to at 25 dols. per M. of 30 bundles ?

NOTE. Hoops are sometimes bound in bundles of 30 hoops each, and 4 such bundles are 1 hundred, and 10 hundred or 40 bundles, 1 thousand. But they are generally bound in bundles of 40 each, 3 bundles making 1 hundred, and 10 hundred or 30 bundles, 1 thousand.

			3)56					
hund.	dols.			Or	bund.	dols.	bund.	
If 10	: 25	::	18 $\frac{2}{3}$	hundreds	30	: 25	::	56
			25					25
			<hr/>					<hr/>
			90					280
			36					112
			16 $\frac{2}{3}$					<hr/>
			<hr/>					3)0)140)0
			1)0)46,6 $\frac{2}{3}$					<hr/>
			<hr/>					46,66 $\frac{2}{3}$
			46,6 $\frac{2}{3}$					

Ans. 46 dols. 6 $\frac{2}{3}$ dimes, or 66 $\frac{2}{3}$ cts.

55. How many bushels of salt, at 4 dols. 75 cts. per hhd. can I have for 326 dollars ?

dols. cts. bush. dols.
If 4 75 : 8 :: 326 Ans. 549 bushels, when measured on board the vessel.

If 4 75 : 7 $\frac{1}{2}$:: 326 Ans. 514 bushels three pecks, nearly, when measured ashore.

56. What is the tax on lands, &c. valued at 2957 dols. in the direct tax, at 28 cents and 3 mills on the 100 dollars ?

Ans. 8 dols. 36 cts. 8 ms.

57. What is the tax on a house, valued at 900 dollars, in the direct tax, at $\frac{3}{10}$ per cent. ?

dols dols. dols.
If 100 : ,3 :: 900

27,000

Ans. '2 dols. 70 cts.

Or, As $\frac{3}{10}$ per cent. is equal to 3 mills on the dollar, multiplying the sum in dollars by 3, gives the answer in mills.

EXAMPLE.

58. What is the tax on 753 dollars at $\frac{3}{10}$ per cent. ?

753 dollars
3 mills

2259 mills.

Ans. 2 dols. 25 cts. 9 ms.

59. Find the tax on the following sums—

dols.			dols. cts.
viz. 1550	at $\frac{4}{10}$	per cent.	Ans. 6. 20
4560	$\frac{5}{10}$	.....	22 80
7850	$\frac{6}{10}$	.....	47 10
12680	$\frac{7}{10}$	.....	88 76
16950	$\frac{8}{10}$	.....	135 60
24620	$\frac{9}{10}$	.....	221 58
35840	1	.....	358 40

60. What will a piece of land, measuring 48 feet in length and 40 feet in width at each end, amount to at 20 dollars per square rod ?

feet.
48
40

feet. dols.
If $272\frac{1}{2} : 20 :: 1920$

By decimals.

Ans. 141 dols. 4 cts.

If $272.25 : 20 :: 1920$

61. A charter-party for a vessel of 186 tons commenced on 28th of May, and ended on the 10th of October following : What does the hire amount to for that time, at 2 dols. per ton per month of 30 days ?

days.			days.
	186 tons.		May 4
	2 dols. per mo.		June 30
			July 31
			August 31
			September.. 30
			October.... 10
days.			
30	:	372	
		136	
		<u>2232</u>	
		1116	
		372	
		<u>3,05039,2</u>	
		1686,40	

Ans. 1686 dols. 40 cts.

In calculating the time, the days of receiving and discharging the vessel are both included.

INVERSE PROPORTION.

WHEREAS in the Rule of Three Direct, more requires more, and less requires less, in this rule more requires less and less requires more.

RULE. After stating the terms as in the Rule of Three Direct, multiply the first and second terms together, and divide the product by the third, and the quotient is the answer.

EXAMPLES.

1. If 100 workmen complete a piece of work in 12 days, how many are sufficient to do it in 3 days ?

$$\begin{array}{ccccccc} d. & & m. & & d. & & \\ 12 & : & 100 & : : & 3 & & \\ & & 12 & & & & \end{array}$$

$$\begin{array}{r} 3 \overline{)1200} \\ \underline{} \end{array}$$

400

Ans. 400 men.

2. If 8 boarders drink a barrel of cider in 12 days, how long would it last if 4 more came among them ? Ans. 8 days.

3. A ship's company of 15 persons is supposed to have bread to last their voyage, allowing each 8 ounces per day—when they pick up a crew of 5 persons in distress, to whom they are willing to communicate, what will the daily allowance of each person then be ? Ans. 6 ounces.

4. When wheat is sold at 93 cts. per bushel, the penny loaf weighs 12 ounces—what must it weigh when the wheat is 1 dol. 24 cts. per bushel ? Ans. 9 ounces.

5. How many yards of baize, 3 qrs. wide, will line a cloak, which has in it 12 yds. of camblet, half yard wide ? Ans. 8 yds.

6. Suppose 400 men in a garrison are provided with provisions for 30 days, how many men must be sent out, if they would have the provisions last 50 days ? Ans. 160 men.

7. What sum should be put to interest to gain as much in 1 month, as 127 dollars would gain in 12 months ?

Ans. 1524 dols.

COMPOUND PROPORTION.

COMPOUND PROPORTION teaches to resolve such questions, as require two or more statings by simple proportion.

RULE. State the question, by placing the three conditional terms in this order: that which is the principal cause of gain, loss, or action, possesses the first place; that which denotes space of time or distance of place, the second; and that which is the gain, loss, or action, the third; then place the other two terms, which move the question, under those of the same name, and if the blank place fall under the third, multiply the three last terms for a dividend, and the two first for a divisor: but if the blank fall under the first or second place, multiply the first, second, and last terms together for a dividend, and the other two for a divisor; and the quotient will be the answer.

EXAMPLES.

1. If £.100 in 12 months gain £.5, how much will £.400 gain in 3 months?

$$\begin{array}{rcl}
 \text{£.} & \text{mo.} & \text{£.} \\
 100 & : 12 & :: 5 \\
 400 & : 3 & \\
 \hline
 & & 3 \\
 \hline
 100 & 1200 & \\
 12 & 5 & \\
 \hline
 12 \overline{) 6000} & & \\
 \hline
 & & \text{£.5}
 \end{array}$$

Ans. £.5

2. If 8 men make 24 rods of wall in 6 days, how many men will build 18 rods in 3 days?

$$\begin{array}{rcl}
 m. & d. & r. \\
 8 & : 6 & :: 24 \\
 & : 3 & :: 18 \\
 & & 6 \\
 \hline
 24 & 108 & \\
 3 & 8 & \\
 \hline
 72 & 864 & (12 \\
 & 72 & \\
 \hline
 & 144 & \\
 & 144 & \\
 \hline
 & & \text{---}
 \end{array}$$

G

Ans. 12 men.

COMPOUND PROPORTION.

3. If a family of 9 persons spend 450 dollars in 5 months, how much would be sufficient to maintain them 8 months, if five more were added to the family? Ans. 1120 dolls.

4. What is the interest of £.240 for 50 days, at 5 per cent. per annum?

£.	days.	£.
100	: 365	:: 5
240	: 50	
50		

100 12000
 365 5

 365 | 00) 600 | 00 (1 12 10½
 365

 235
 20

 365 | 4700 (12
 4380

 320
 12

 365 | 3840 (10
 365

 190
 4

 365 | 760 (2
 730

 30

Ans. £. 1 12 10½

N.B. By omitting to multiply by the rate per cent. and dividing 36500 by it, are found the fixed divisors of 7300 for 5, and 6083 for 6 per cent. per annum, sometimes used in calculating interest.

COMPOUND PROPORTION.

75

5. What is the interest of 654 dollars for 164 days, at 6 per cent. per annum ?

100	654 dollars.
365	164
<hr/>	
6) 36500	2616
	3924
6083 the fixed divisor,	654
found as above directed.	<hr/>
	6083) 107256 (17,632
	6083
	<hr/>
	46426
	42581
	<hr/>
	38450
	36498
	<hr/>
	19520
	18249
	<hr/>
	12710
	12166
	<hr/>

544 Ans. 17d. 63c. 2m.

6. What is the interest of 947 dollars, for 294 days, at 5 per cent. per annum ?

	947 dolls.
	294.
	<hr/>
	3788.
	8523.
	1894
	<hr/>
Fixed divisor	7300) 278418 (38,139
	21900
	<hr/>
	59418
	58400
	<hr/>
	10180
	7300
	<hr/>
	28800
	21900
	<hr/>
	69000
	65700
	<hr/>
	3300

Ans. 38 dols. 13c. 9m.

VULGAR FRACTIONS.

FRACTIONS, or broken numbers, are expressions for any assignable parts of an unit; and are represented by two numbers, placed one above the other, with a line drawn between them.

The number above the line is called the *numerator*, and that below the line the *denominator*.

The denominator shews how many parts the integer is divided into, and the numerator shews how many of those parts are meant by the fraction.

Fractions are either proper, improper, compound, or mixed.

1st. A *proper fraction* is when the numerator is less than the denominator, as $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, &c.

2d. An *improper fraction* is when the numerator is either equal to or greater than the denominator, as $\frac{8}{5}$, $\frac{11}{9}$, $\frac{12}{10}$, $\frac{35}{20}$, &c.

3d. A *compound fraction* is a fraction of fractions, and known by the word *of*, as $\frac{1}{2}$ of $\frac{2}{3}$, $\frac{7}{9}$ of $\frac{9}{10}$, $\frac{15}{16}$ of $\frac{3}{4}$, &c.

4th. A *mixed number or fraction* is composed of a whole number and fraction, as $8\frac{2}{3}$, $17\frac{1}{2}$, $29\frac{3}{4}$, &c.

I. To reduce a simple fraction to its lowest terms.

RULE. Find a common measure by dividing the lower term by the upper, and that divisor by the remainder, continuing till nothing remains; the last divisor is the common measure; then divide both parts of the fraction by the common measure, the quotients express the fraction required.

NOTE. If the common measure happens to be 1, the fraction is already in its lowest term; and when a fraction hath cyphers at the right hand, it may be abbreviated by cutting them off, as $\frac{2}{30}$.

EXAMPLES.

1. Reduce $\frac{91}{117}$ to its lowest term.

$$\begin{array}{r} 91 \overline{) 117} \quad (1 \\ \underline{91} \\ 26 \\ \underline{26} \\ 0 \end{array}$$

Common measure 26

$\frac{13}{9}$ the answer.

Or; divide the terms of the fraction by any number that will divide them without a remainder; divide the quotients in the same manner, and so on, till no number will divide them both, and the last quotients express the fraction in its lowest terms.

EXAMPLES.

- 2.. Reduce $1\frac{2}{3}$ to its lowest terms.

$$\begin{array}{ccccccc} & (8) & (8) & (3) & & & \\ & 192 & 24 & 3 & 1 & & \\ \hline & 576 & 72 & 9 & 3 & & \end{array} \quad \text{the answer:}$$

- 3.. Reduce $1\frac{1}{2}$ to its lowest terms.. Ans. $\frac{3}{2}$.
 4. Reduce $1\frac{1}{3}$ to its lowest terms.. Ans. $\frac{4}{3}$.
 5. Reduce $1\frac{1}{2}$ to its lowest terms.. Ans. $1\frac{1}{2}$.

II. To reduce a mixt number to an improper fraction.

RULE. Multiply the whole numbers by the denominator of the fraction, and to the product add the numerator for a new numerator, and place it over the denominator.

NOTE. To express a whole number fraction-wise, set 1 for a denominator to the given number.

EXAMPLES.

1. Reduce $5\frac{3}{8}$ to an improper fraction..
 $5 \times 8 + 3 = \frac{43}{8}$ the answer..
 2. Reduce $183\frac{1}{2}$ to an improper fraction.. Ans. $\frac{367}{2}$.
 3. Reduce $27\frac{2}{3}$ to an improper fraction.. Ans. $\frac{542}{3}$.
 4. Reduce $514\frac{1}{6}$ to an improper fraction.. Ans. $\frac{3085}{6}$.

III. To reduce an improper fraction to its proper terms..

RULE. Divide the upper term by the lower, and the quotient will be the whole number; the remainder, if any, will be the numerator to the fractional part.

EXAMPLES.

1. Reduce $1\frac{1}{2}$ to its proper terms..
 $5)17(3\frac{2}{5}$ the answer.
 $\begin{array}{r} 15 \\ \hline 2 \end{array}$
 2. Reduce $2\frac{1}{3}$ to its proper terms.. Ans. $2\frac{1}{3}$.
 3.. Reduce $5\frac{1}{2}$ to its proper terms.. Ans. $5\frac{1}{2}$.

IV. *To find the least common multiple or denominator.*

RULE. Divide the given denominators by any number that will divide two or more of them without a remainder, and set the quotients and the undivided numbers underneath. Divide these quotients and undivided numbers by any number that will divide two or more of them as before, and thus continue, till no two numbers are left capable of being lessened.

Multiply the last quotients and the divisor or divisors together, and the product will be the least common denominator required.

EXAMPLES.

1. What is the least common measure of $\frac{5}{9}$, $\frac{7}{8}$, $\frac{6}{15}$, $\frac{8}{16}$?

$$\begin{array}{r} 8 \overline{) 9 \quad 8 \quad 15 \quad 16} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \overline{) 9 \quad 1 \quad 15 \quad 2} \\ \hline \end{array}$$

$$\begin{array}{r} 3 \quad 1 \quad 5 \quad 2 \\ \hline \end{array}$$

$$3 \times 5 \times 2 = 30 \times 3 \times 8 = 720 \text{ ans.}$$

2. What is the least number that can be divided by the nine digits without a remainder? Ans. 2520.

V. *To reduce vulgar fractions to a common denominator.*

RULE. Find a common denominator by the last case, in which divide each particular denominator, and multiply the quotient by its own numerator, for a new numerator, and the new numerators, being placed over the common denominator, express the fractions required in their lowest terms.

EXAMPLES.

1. Reduce $\frac{2}{4}$, $\frac{5}{9}$, and $\frac{7}{12}$ to a common denominator.
36 the com. denom.

$$\begin{array}{r} 4 \quad 9 \times 3 = 27 \\ \hline \end{array}$$

$$\begin{array}{r} 9 \quad 4 \times 5 = 20 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \quad 3 \times 7 = 21 \\ \hline \end{array}$$

The fractions will be $\frac{27}{36}$, $\frac{20}{36}$, $\frac{21}{36}$.

2. Reduce $\frac{1}{2}$, $\frac{2}{3}$, $\frac{5}{6}$ and $\frac{7}{8}$ to a common denominator.

$$\text{Ans. } \frac{12}{24}, \frac{16}{24}, \frac{20}{24}, \text{ \& } \frac{21}{24}.$$

3. Reduce $\frac{2}{3}$, $\frac{4}{9}$, $\frac{3}{7}$ and $\frac{5}{21}$ to a common denominator.

$$\text{Ans. } \frac{12}{18}, \frac{8}{18}, \frac{27}{18}, \text{ \& } \frac{15}{18}.$$

4. Reduce $\frac{1}{3}$, $\frac{2}{5}$, $\frac{4}{15}$ and $\frac{5}{9}$ to a common denominator.

$$\text{Ans. } \frac{15}{45}, \frac{27}{45}, \frac{12}{45}, \text{ \& } \frac{25}{45}.$$

VI. To reduce a compound fraction to a single one.

RULE. Multiply all the numerators for a new numerator, and all the denominators for a new denominator, then reduce the new fraction to its lowest term by Case I.

EXAMPLES.

1. Reduce $\frac{2}{3}$ of $\frac{5}{9}$ of $\frac{9}{10}$ to a single fraction.

$$\begin{array}{r} 3 \times 5 \times 9 = 135 \quad 9, \\ \hline 4 \times 6 \times 10 = 240 \quad 16 \end{array} \quad \text{the answer.}$$

2. Reduce $\frac{5}{8}$ of $\frac{4}{7}$ of $\frac{1}{12}$ to a single fraction. Ans. $\frac{5}{168}$.

3. Reduce $\frac{2}{3}$ of $\frac{5}{9}$ of $\frac{4}{5}$ to a single fraction. Ans. $\frac{8}{27}$.

VII. To reduce a fraction of one denomination to the fraction of another, but greater, retaining the same value.

RULE. Reduce the given fraction to a compound one, by multiplying it with all the denominations between it and that denomination, to which you would reduce it; then reduce that compound fraction to a single one.

EXAMPLES.

1. Reduce $\frac{7}{8}$ of a penny to the fraction of a pound,

$$\begin{array}{r} 7 \times 1 \times 1 \quad 7 \\ \hline 8 \times 12 \times 20 \quad 1920 \end{array} \quad \text{the answer.}$$

2. Reduce $\frac{4}{5}$ of a pennyweight to the fraction of a pound Troy. Ans. $\frac{1}{300}$.

3. Reduce $\frac{4}{7}$ of a pound Avoirdupois to the fraction of a cwt. Ans. $\frac{1}{196}$.

VIII. To reduce the fraction of one denomination to the fraction of another, but less, retaining the same value.

RULE. Multiply the numerator by the parts contained in the several denominations between it and that denomination to which you would reduce it for a new numerator, and place it over the denominator of the given fraction.

EXAMPLES.

1. Reduce $\frac{1}{60}$ of a pound to the fraction of a penny.

$$\begin{array}{r} 1 \times 20 \times 12 = 240 \\ \hline 960 \end{array} = \frac{1}{4} \text{ the answer.}$$

2. Reduce $\frac{1}{300}$ of a lb. troy to the fraction of a dwt. Ans. $\frac{1}{30}$.
 3. Reduce $\frac{1}{96}$ of a cwt. to the fraction of a lb. Ans. $\frac{1}{4}$.

IX. *To find the value of the fraction in the known parts of the integer.*

RULE. Multiply the numerator by the known parts of the integer and divide by the denominator.

EXAMPLES.

1. What is the value of $\frac{2}{3}$ of a £. ?

2
20 shillings..

3)40

Ans. 13s. 4d.

2. What is the value of $\frac{1}{4}$ of a shilling ? Ans. 4d. $3\frac{1}{2}$ qrs.

3. Reduce $\frac{2}{3}$ of a lb. troy to its proper quantity.

Ans. 7 oz. 4 dwt.

4. Reduce $\frac{4}{5}$ of a mile to its proper quantity.

Ans. 6 fur. 16 poles..

X. *To reduce any given quantity to the fraction of a greater denomination of the same kind.*

RULE. Reduce the given quantity to the lowest denomination mentioned for a new numerator, under which set the integral part (reduced to the same name) for a denominator, and it will express the fraction required.

EXAMPLES.

1. Reduce 16s. 8d. to the fraction of a pound.

16 8

12

200 5

240 6 = the answer.

2. Reduce 2 quarters $3\frac{1}{2}$ nails to the fraction of an ell Eng-
 lish. Ans. $\frac{5}{8}$.

3. Reduce 4s. $6\frac{1}{2}$ d. to the fraction of a pound.

Ans. $\frac{109}{240}$.

ADDITION OF VULGAR FRACTIONS.

I. To add fractions that have a common denominator.

RULE. Add their numerators together, and place the sum over one of the given denominators.

EXAMPLES.

1. Add $\frac{1}{9}$, $\frac{2}{9}$, $\frac{4}{9}$, $\frac{5}{9}$, and $\frac{7}{9}$ together.

$$\begin{array}{r} 1 \\ 2 \\ 4 \\ 5 \\ 7 \\ \hline 19 \\ \hline \end{array} = 2\frac{1}{9} \text{ the answer.}$$

2. Add $\frac{7}{24}$, $\frac{11}{24}$, and $\frac{13}{24}$ together.

Ans. $1\frac{7}{24}$.

3. Add $\frac{13}{30}$, $\frac{17}{30}$, and $\frac{9}{30}$ together.

Ans. $1\frac{1}{5}$.

4. Add $\frac{7}{16}$, $\frac{13}{16}$, and $\frac{15}{16}$ together.

Ans. $2\frac{1}{4}$.

II. To add mixed numbers whose fractions have a common denominator.

RULE. Add the fractions by the last case, and the integer as in whole numbers.

EXAMPLES.

1. Add $2\frac{1}{11}$, $3\frac{2}{11}$, $4\frac{4}{11}$, and $7\frac{9}{11}$ together.

$$\begin{array}{r} 2\frac{1}{11} \\ 3\frac{2}{11} \\ 4\frac{4}{11} \\ 7\frac{9}{11} \\ \hline 17\frac{5}{11} \text{ answer.} \end{array}$$

2. Add $13\frac{1}{15}$, $9\frac{4}{15}$, and $3\frac{7}{15}$ together.

Ans. $25\frac{2}{3}$.

3. Add $1\frac{1}{2}$, $2\frac{5}{2}$, $3\frac{7}{2}$, and $4\frac{1}{2}$ together.

Ans. 12.

4. Add $9\frac{13}{14}$, $7\frac{9}{14}$, $5\frac{5}{14}$, and $8\frac{1}{14}$ together.

Ans. $31\frac{1}{2}$.

III. To add fractions, having different denominators.

RULE. Find the least common denominator by Case III. in Reduction, in which divide each denominator, and multiply

the quotient by its numerator; the sum of the products is a new numerator to the common denominator, and the fraction required.

EXAMPLES.

1. Add $\frac{2}{3}$, $\frac{3}{4}$, $\frac{5}{6}$, $\frac{7}{8}$, and $1\frac{1}{2}$ together.
24 com. denom.

$$\begin{array}{r} 3 \quad 8 \times 2 = 16 \\ 4 \quad 6 \times 3 = 18 \\ 6 \quad 4 \times 5 = 20 \\ 8 \quad 3 \times 7 = 21 \\ 12 \quad 2 \times 11 = 22 \end{array}$$

$$\frac{87}{24} = 3\frac{7}{8} \text{ the answer.}$$

2. Add $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{3}$, $\frac{1}{7}$, and $\frac{1}{8}$ together. Ans. $1\frac{67}{840}$.
3. Add $\frac{4}{8}$, $\frac{3}{6}$, $\frac{2}{7}$, $\frac{5}{8}$, and $\frac{8}{12}$ together. Ans. $3\frac{67}{84}$.

IV. To add mixt numbers whose fractions have different denominators.

RULE. Add the fractions as in the last case, and the integers as in whole numbers.

EXAMPLES.

1. Add $5\frac{2}{3}$, $6\frac{7}{8}$, and $4\frac{1}{2}$ together.
24 com. denom.

$$\begin{array}{r} 5\frac{2}{3} \quad 16 \\ 6\frac{7}{8} \quad 21 \\ 4\frac{1}{2} \quad 12 \\ \hline \end{array}$$

$$\text{Ans. } 17\frac{1}{4} \quad \frac{42}{24} = 1\frac{7}{6}$$

2. Add $1\frac{3}{5}$, $\frac{2}{3}$ of $\frac{1}{2}$, and $9\frac{3}{10}$ together. Ans. $11\frac{5}{10}$.
3. Add $1\frac{2}{10}$, $6\frac{7}{8}$, $\frac{2}{3}$ of $\frac{1}{2}$, and $7\frac{1}{2}$ together. Ans. $16\frac{73}{80}$.

V. When the fractions are of several denominations.

RULE. Reduce them to their proper quantities by Case IX. in Reduction, and add as before.

VULGAR FRACTIONS.

33

EXAMPLES.

1. Add $\frac{7}{8}$ of a £. to $\frac{3}{10}$ of a shilling.

15 common measure.

$\frac{7}{8}$ of a £. = 15	$\frac{3}{10}$ of a s. = 0	—
	$6\frac{2}{5}$	10
	$3\frac{3}{5}$	9
Ans. 15 10 $\frac{4}{5}$		$1\frac{2}{5} = 1\frac{4}{10}$

2. Add $\frac{2}{3}$ of a yard, $\frac{2}{3}$ of a foot, and $\frac{7}{8}$ of a mile together.

Ans. 1540 yds. 2 ft. 9 inches.

3. Add $\frac{1}{3}$ of a week, $\frac{1}{4}$ of a day, and $\frac{1}{2}$ of an hour together.

Ans. 2 d. $14\frac{1}{2}$ h.

SUBTRACTION OF VULGAR FRACTIONS.

- I. To find the difference between simple fractions that have a common denominator.

RULE. Subtract the less numerator from the greater, and under the remainder put the denominator.

EXAMPLES.

From	$\frac{5}{7}$	$\frac{11}{12}$	$\frac{15}{16}$	$\frac{17}{35}$	$\frac{105}{209}$
Take	$\frac{2}{7}$	$\frac{5}{12}$	$\frac{8}{16}$	$\frac{13}{35}$	$\frac{99}{209}$
	Rem.	Rem.	Rem.	Rem.	Rem.
	$\frac{3}{7}$	$\frac{1}{2}$	$\frac{4}{16}$	$\frac{4}{35}$	$\frac{6}{209}$

- II. To subtract a fraction or mixt number from a whole number.

RULE. Subtract the numerator from the denominator, and under the remainder put the denominator, and carry one to be deducted from the integer.

EXAMPLES.

From	3	6	10	9	100
Take	$0\frac{3}{10}$	$0\frac{7}{8}$	$0\frac{1}{10}$	$5\frac{1}{2}$	$99\frac{2}{100}$
	Rem.	Rem.	Rem.	Rem.	Rem.
	$2\frac{7}{10}$	$5\frac{1}{8}$	$9\frac{9}{10}$	$3\frac{1}{2}$	$0\frac{1}{100}$

III. To subtract simple fractions that have no common denominator.

RULE. By Case IV, in Reduction, find a common denominator, in which divide each denominator, and multiply the quotient by its numerator; the difference between the products thus found is a numerator to the common denominator, and the answer required.

EXAMPLES.

From $\frac{1}{2}$ take $\frac{2}{4}$.

42 com. denom.

$$\begin{array}{r} 21 \quad 2 \times 17 = 34 \\ 14 \quad 3 \times 9 = 27 \end{array}$$

Rem. $\frac{7}{42} = \frac{1}{6}$, the answer.

From $\frac{5}{8}$	$\frac{11}{14}$	$\frac{5}{6}$	$\frac{8}{15}$	$\frac{202}{216}$
Take $\frac{7}{8}$	$\frac{3}{4}$	$\frac{4}{5}$	$\frac{20}{20}$	$\frac{7}{144}$
<hr style="width: 100px; border: 0.5px solid black;"/>	<hr style="width: 100px; border: 0.5px solid black;"/>	<hr style="width: 100px; border: 0.5px solid black;"/>	<hr style="width: 100px; border: 0.5px solid black;"/>	<hr style="width: 100px; border: 0.5px solid black;"/>
Rem. $\frac{1}{8}$	$\frac{1}{4}$	$\frac{1}{30}$	$\frac{1}{12}$	$\frac{327}{432}$

In order to distinguish the greater of two fractions, let them be reduced to a common denominator, as in case V. in Reduction; and that fraction, whose numerator is greater, is the greater fraction; the difference between the new numerators, being set over the common denominator, will shew the excess or inequality.

EXAMPLE.

Which of the two is the greater fraction, $\frac{1}{2}$ or $\frac{1}{3}$?

48 com. denom.

$$\begin{array}{r} 12 \quad 4 \times 11 = 44 \\ 16 \quad 3 \times 15 = 45 \end{array}$$

Ans. $\frac{1}{2}$ is greater by $\frac{1}{48}$.

IV. To subtract a fraction or mixt number from a mixt number, when the fractional part to be subtracted is greater than that from which it is to be subtracted.

RULE. Find a common denominator and a new numerator, as in the last case, and then subtract the numerator of the greater fraction from the common denominator, and to the re-

remainder add the less numerator, and set the sum of both for a new numerator over the common denominator, and carry one to the integral part, and proceed as in whole numbers.

EXAMPLES.

				27 common denominator.
From	$13\frac{1}{6}$	$3 \times 1 = 3$		
Take	$8\frac{2}{3}$	$1 \times 14 = 14$		
	<hr/>	<hr/>		
	$4\frac{1}{2}$	$1\frac{1}{2}$		
From	$6\frac{1}{2}$	$10\frac{3}{10}$	$12\frac{5}{2}$	$19\frac{5}{11}$
Take	$0\frac{7}{8}$	$1\frac{7}{12}$	$6\frac{1}{2}$	$0\frac{7}{15}$
	<hr/>	<hr/>	<hr/>	<hr/>
Rem.	$5\frac{1}{8}$	$8\frac{1}{6}$	$5\frac{1}{2}$	$18\frac{16}{165}$

V. When the fractions are of different denominations.

RULE. Reduce them to their proper quantities, and subtract as before.

EXAMPLES.

2. From $\frac{7}{9}$ of a £. take $\frac{3}{10}$ of a shilling.

		15 common denominator.	
$\frac{7}{9}$ of a £.	s.	d.	—
$\frac{7}{9}$ of a £.	= 15	$6\frac{2}{3}$	10
$\frac{2}{30}$ of a s.	= 0	$3\frac{2}{5}$	9
<div style="display: flex; justify-content: space-between;"> Rem. 15 $3\frac{1}{5}$ </div>			

2. From $\frac{3}{4}$ of a £. take $\frac{3}{4}$ of a shilling. Ans. 14s. 3d.
3. From $\frac{3}{4}$ of a lb. troy take $\frac{1}{6}$ of an ounce.
Ans. 8 oz. 16 dwt. 16 grs.
4. From 7 weeks take $9\frac{7}{10}$ days. Ans. 5w. 4d. 7h. 12m.
5. From $\frac{1}{4}$ of a yard take $\frac{3}{4}$ of an inch. Ans. 5 inch. 1 bc.

MULTIPLICATION OF VULGAR FRACTIONS.

RULE. Reduce compound fractions to simple ones, and mixt numbers to improper fractions; then multiply the numerators together for a new numerator, and the denominators for a new denominator.

EXAMPLES.

1. Multiply
- $4\frac{1}{2}$
- by
- $\frac{1}{8}$
- .

$$\begin{array}{r} 4\frac{1}{2} \\ 2 \\ \hline \end{array}$$

$$\frac{9 \times 1}{2 \times 8}$$

$$= \frac{9}{16}, \text{ the answer.}$$

2. Multiply
- $\frac{3}{8}$
- by
- $\frac{4}{5}$
- .

Ans. $\frac{3}{10}$.

3. Multiply
- $\frac{7}{9}$
- by
- $\frac{2}{3}$
- .

Ans. $\frac{14}{27}$.

4. Multiply
- $48\frac{3}{4}$
- by
- $13\frac{5}{8}$
- .

Ans. $672\frac{3}{10}$.

5. Multiply
- $\frac{3}{4}$
- of 9 by
- $\frac{7}{8}$
- .

Ans. $5\frac{3}{8}$.

6. Multiply
- $\frac{9}{10}$
- by
- $\frac{2}{3}$
- of
- $\frac{3}{4}$
- of
- $\frac{5}{6}$
- .

Ans. $\frac{3}{8}$.

DIVISION OF VULGAR FRACTIONS.

RULE. Prepare the fractions, if necessary ; then invert the divisor, and proceed as in multiplication.

EXAMPLES.

1. Divide
- $\frac{4}{5}$
- by
- $\frac{2}{3}$
- .

$$\frac{4 \times 3}{7 \times 2}$$

$$= \frac{12}{14} = \frac{6}{7} \text{ the answer.}$$

2. Divide
- $3\frac{1}{2}$
- by
- $9\frac{1}{2}$
- .

$$\begin{array}{r} 3\frac{1}{2} \quad 9\frac{1}{2} \\ 6 \quad 2 \\ \hline \end{array}$$

$$\frac{12}{6} \quad \frac{19}{2} \text{ Then } \frac{19 \times 2}{6 \times 19} = \frac{38}{114} = \frac{1}{3} \text{ the answer.}$$

3. Divide 5 by
- $\frac{7}{10}$
- .

Ans. $7\frac{1}{7}$.

4. Divide
- $\frac{2}{10}$
- by
- $4\frac{1}{2}$
- .

Ans. $\frac{1}{5}$.

5. Divide
- $9\frac{1}{2}$
- by
- $\frac{1}{2}$
- of 7.

Ans. $21\frac{3}{4}$.

6. Divide
- $5205\frac{1}{2}$
- by
- $\frac{2}{3}$
- of 91.

Ans. $71\frac{1}{2}$.

MISCELLANEOUS QUESTIONS

IN THE PRECEDING RULES.

1. What part is $28\frac{1}{2}$ of $33\frac{1}{2}$? Ans. $\frac{7}{8}$.
 2. What will remain if $13\frac{1}{2}s.$ and $7\frac{1}{2}d.$ be taken from $\pounds.1$?
 Ans. $5s. 6\frac{3}{4}d.$

3. Which is the greater fraction $\frac{8}{15}$ or $\frac{9}{10}$?
 Ans. $\frac{8}{15}$ is greater by $\frac{1}{12}$.
4. Of what number is 176 the $\frac{1}{3}$ part? Ans. 368.
5. By how much must you multiply $13\frac{2}{3}$ that the product may be $49\frac{1}{2}$? Ans. $3\frac{3}{4}$.
6. Find two numbers so that $\frac{1}{3}$ of the one will be as much as $\frac{1}{6}$ of the other? Ans. 126 & 208, or 63 & 104, &c.
7. Which is greater, $\frac{1}{2}$ of 6s. or 1s. $2\frac{1}{2}d$.
 Ans. 1s. $2\frac{1}{2}d$. is greater by $\frac{1}{10}d$.
8. A has $\frac{2}{3}$ of $\frac{1}{2}$ of a ship, and B $\frac{3}{8}$ of $\frac{1}{2}$, which is the greater share, and by how much? Ans. A's share is greater by $\frac{1}{2}$.
9. A farmer being asked, how many sheep he had, answered, that he had them in 5 fields; in the first he had $\frac{1}{2}$ of his flock, in the second $\frac{1}{6}$, in the third $\frac{1}{8}$, in the fourth $\frac{1}{12}$, and in the fifth 450; how many had he? Ans. 1200.

RULE OF THREE DIRECT IN VULGAR FRACTIONS.

RULE. Having stated the question, make the necessary preparations, as in Reduction of Fractions, and invert the first term; then proceed as in Multiplication of Fractions.

EXAMPLES.

1. If $\frac{1}{4}$ of a yard of cloth cost $\frac{2}{3}$ of a shilling, what will $\frac{7}{8}$ of a yard come to?

$$\begin{array}{rclcl}
 & yd. & & s. & yd. \\
 \text{If } \frac{1}{4} & : & \frac{2}{3} & :: & \frac{7}{8} \\
 \text{inverted} & & & & \\
 \frac{4 \times 2 \times 7}{1 \times 3 \times 8} & = & \frac{56}{24} & = & 2s. 4d. \text{ the answer.}
 \end{array}$$

2. If $\frac{3}{10}$ of a ship cost £273 2s. 6d. what are $\frac{5}{12}$ of her worth? Ans. £227 12s. 1d.
3. If $\frac{1}{4}$ of a yard cost $\frac{2}{3}$ of a pound, what will $\frac{3}{4}$ of an ell English come to, at the same rate? Ans. £2.
4. A person, having $\frac{3}{4}$ of a coal mine, sells $\frac{1}{2}$ of his share for £171: what is the whole mine valued at? Ans. £380.

Single Rule of Three inverse in Vulgar Fractions.

EXAMPLES.

1. If $25\frac{1}{2}s.$ will pay for the carriage of an cwt. $145\frac{1}{4}$ miles, how far may $6\frac{1}{2}$ cwt. be carried for the same money?

Ans. $22\frac{9}{16}$ miles.

2. If $3\frac{1}{4}$ yds. of cloth that is $1\frac{1}{2}$ yard wide, be sufficient to make a cloak, how much must I have of that sort, which is $\frac{2}{3}$ yard wide, to make another of the same bigness? Ans. $4\frac{7}{8}$ yds.

3. If 3 men can do a piece of work in $4\frac{1}{2}$ hours, in how many hours will 10 men do the same work? Ans. $1\frac{7}{10}$.

4. If the penny white-loaf weigh 7 oz. when a bushel of wheat cost $5s. 6d.$ what is the bushel worth when the penny white-loaf weighs but $2\frac{1}{2}$ oz. Ans. $15s. 4\frac{1}{2}d.$

.....

PRACTICE

Is a contraction of the Rule of Three direct, when the first term happens to be an unit, or one, and has its name from its frequent use in business.

THE TABLE.

Parts of a £.			Parts of a Ton.			Parts of $\frac{1}{2}$ Cwt.		
s.	d.		Cwt.	Qr.		lb.		
10		is $\frac{1}{2}$	10		is $\frac{1}{2}$	28	is	$\frac{1}{2}$
6	8	..... $\frac{1}{3}$	5		.... $\frac{1}{4}$	14	.....	$\frac{1}{4}$
5		..... $\frac{1}{4}$	4		.... $\frac{1}{5}$	8	.....	$\frac{1}{8}$
4		..... $\frac{1}{5}$	2	2	.... $\frac{1}{8}$	7	.....	$\frac{1}{8}$
3	4	..... $\frac{1}{6}$	2		.... $\frac{1}{10}$	4	.....	$\frac{1}{4}$
2	6	..... $\frac{1}{8}$	1		.... $\frac{1}{20}$	3½	.....	$\frac{1}{6}$
2		..... $\frac{1}{10}$				2	.....	$\frac{1}{28}$
1	8	..... $\frac{1}{12}$	Parts of a Cwt.			Parts of $\frac{1}{4}$ Cwt.		
1		..... $\frac{1}{20}$	Qrs. lb.			lb.		
Parts of a shilling.			2		is $\frac{1}{2}$	14	is	$\frac{1}{2}$
d.			1		.... $\frac{1}{4}$	7	.....	$\frac{1}{4}$
6		is $\frac{1}{2}$	16		.... $\frac{1}{7}$	4	.....	$\frac{1}{4}$
4		..... $\frac{1}{3}$	14		.... $\frac{1}{8}$	3½	.....	$\frac{1}{8}$
3		..... $\frac{1}{4}$	8		.... $\frac{1}{14}$	2	.....	$\frac{1}{4}$
2		..... $\frac{1}{6}$	7		.... $\frac{1}{16}$	1	.....	$\frac{1}{28}$
1½		..... $\frac{1}{8}$	4		.... $\frac{1}{28}$			
1		..... $\frac{1}{12}$	2		.... $\frac{1}{56}$			

CASE I.

When the price is an aliquot, or even part of a shilling.

RULE. Divide the given number by the part, and the quotient is the answer in shillings; what remains is to be reduced as in Compound Division.

EXAMPLES.

1. What will 4596 yards cost at 6d. per yard?

$$\begin{array}{r|l} 6d. \frac{1}{2} & 4596 \\ \hline 210 & 229 \frac{1}{2} \end{array}$$

114 18

Ans. £.114 18s.

	Yards.	d.		£.	s.	d.
2.	3746	at 4 per yard.		Ans. 62	8	8
3.	1095	..... 3	.....	13	13	9
4.	7596	..... 2	.....	63	6	0
5.	3747	..... 1	.....	15	12	3
6.	3203	..... 1½	.....	20	0	4½

CASE II.

When the price is pence, or pence and farthings, and no even part of a shilling.

RULE. Find the even parts for the price, and proceed as in Case I. and the sum of the quotients is the answer.

EXAMPLES.

1. What will 4937 yards come to, at 9d. per yard?

$$\begin{array}{r|l} 6 \frac{1}{2} & 4937 \\ \hline 3 \frac{1}{2} & 2468 \frac{6}{8} \\ & 1234 \frac{3}{4} \\ \hline 210 & 370 \frac{1}{2} \frac{9}{8} \end{array}$$

Ans. £.185 2 9

	Yards.		d.		Ans.	£.	s.	d.
2.	2765	at	8	per yard.		92	3	4
3.	3762	.....	7	.....		109	14	6
4.	3159	.....	7½	.....		98	14	4½
5.	1496	.....	11	.....		68	11	4
6.	1895	.....	10½	.....		82	18	1½
7.	4689½	....	5	.....		97	13	11½
8.	3689	.....	8½	.....		126	16	2½
9.	1871	.....	2½	.....		19	9	9½
10.	8914	.....	8½	.....		306	8	4½
11.	2563½	....	9½	.....		101	9	5½
12.	95½	....	10½	.....		4	3	9½
13.	201½	....	9	.....		7	10	11½

CASE III.

When the price is shillings, or shillings and pence, and an even part of a pound.

RULE. Divide the given quantity by the even part, and the quotient is the answer in pounds. If there be a remainder, reduce it as in Compound Division.

EXAMPLES.

1. At 6s. 8d. per yard, what will 473 yards come to?

$$6s. 8d. \mid \frac{1}{3} \mid 473$$

Ans. £.157 13s. 4d.

	yards.		s.	d.		Ans.	£.	s.	d.
2.	387	at	10				193	10	0
3.	478	.....	5	.....			119	10	0
4.	397	.....	3	4	.....		66	3	4
5.	797½	.....	2	6	.....		99	13	9
6.	159½	.....	1	8	.....		13	5	5

CASE IV.

When the price is shillings or shillings and pence, which makes no even part of a pound.

RULE. Find the even parts for the price, and divide as in Case III. or multiply the given quantity by the shillings, and take the even parts of shillings for the pence, as in Case II.

EXAMPLES.

1. What cost 287 yards at 17s. 6d. per yard.

First method.

287	
s. d.	
10	143 10
5	71 15
2. 6	35 17 6

Ans. 251l. 2s. 6d.

Second method.

287	
17 6	
2009	
287	
6 | 1/2 | 143 6.	
2|0)502|2 6	

Ans. 251l. 2s. 6d.

	yards.	at	s. d.	Ans.	£.	s. d.
2.	8172		15	Ans. 6129		
3.	3691	.....	19	.....	3506	9
4.	4765	.....	11 8	.....	2779	11 8
5.	3718	.....	18 4	.....	3408	3 4
6.	709 1/2	.....	12 6	.....	443	5 7 1/2
7.	213	.....	14 10	.....	157	19 6
8.	96 1/2	.....	2 9 1/2	.....	13	9 4 1/2
9.	158	.....	5 8 1/2	.....	45	5 2 1/2
10.	4705 1/2	.....	3 9	.....	882	6 6 1/2
11.	127	.....	7 5 1/2	.....	47	9 10 1/2

CASE V.

When the price is an even number of shillings.

RULE. Multiply the quantity by half the shillings, doubling the first (or right hand) figure of the product for shillings, the rest are pounds.

EXAMPLES.

1. What will 788 yards come to, at 2 shillings per yard?

788

1 = half the shillings.

Ans. £.78 16.

	yards.	at	s.	Ans.	£.	s.
2.	347		4	Ans. 69		8
3.	638	.....	6	.....	191	8
4.	589 1/2	.....	8	.....	235	14
5.	246	.....	10	.....	123	0
6.	324 1/2	.....	12	.....	194	17
7.	523	.....	14	.....	366	2
8.	745	.....	16	.....	596	0
9.	373 1/2	.....	18	.....	336	3
10.	270	.....	20	.....	270	0
11.	172 1/2	.....	22	.....	189	15
12.	89 1/2	.....	24	.....	107	2

CASE VI.

When the price is pounds, shillings, &c.

RULE. Multiply the integers of the given quantity by the pounds, and work for the shillings, &c. by such of the preceding rules as you think best, and work likewise for the fractional parts of the integer; the sum of these will give the answer.

EXAMPLES.

1. What will 173 cwt. 1 qr. 14 lb. of sugar come to, at £3 15s. 6d. per cwt.?

$$\begin{array}{r}
 173 \quad 1 \quad 14 \\
 3 \quad 15 \quad 6 \\
 \hline
 \begin{array}{l}
 s. \quad d. \\
 10 \quad | \quad \frac{1}{2} \quad | \quad 86 \quad 10 \\
 5 \quad | \quad \frac{1}{2} \quad | \quad 43 \quad 5 \\
 6 \quad | \quad \frac{1}{10} \quad | \quad 4 \quad 6 \quad 6 \\
 \hline
 1 \text{ qr.} \quad | \quad \frac{1}{2} \quad | \quad 0 \quad 18 \quad 10\frac{1}{2} \\
 14 \text{ lb.} \quad | \quad \frac{1}{2} \quad | \quad 0 \quad 9 \quad 5\frac{1}{2} \\
 \hline
 \text{Ans. } £.654 \quad 9 \quad 9\frac{1}{2}
 \end{array}
 \end{array}$$

	cwt.	qrs.	lb.		s.	d.		£.	s.	d.
2.	219	2	19	at	69	11	Ans.	767	18	6 $\frac{1}{2}$
3.	310	3	22	.....	53	8	.....	834	7	5 $\frac{1}{2}$

In working questions of this kind; when the quantity is not above the multiplication table, the following method is used.

1. What will 45 cwt. 2 qrs. 14 lb. of sugar come to, at £3 7 9 per cwt.?

$$\begin{array}{r}
 3 \quad 7 \quad 9 \\
 5 \\
 \hline
 16 \quad 18 \quad 9 \\
 9 \\
 \hline
 152 \quad 8 \quad 9 \quad \text{price of 45 cwt.} \\
 2 \text{ qrs.} \quad \frac{1}{2} \quad 1 \quad 13 \quad 10\frac{1}{2} \quad \text{price of 2 qrs.} \\
 14 \text{ lb.} \quad \frac{1}{2} \quad 0 \quad 8 \quad 5\frac{1}{2} \quad \text{price of 14 lb.} \\
 \hline
 \text{Ans. } £.154 \quad 11 \quad 1
 \end{array}$$

	Tons.	cwt.	qrs.	lb.		l.	s.	d.		l.	s.	d.
2.		57	2	8	.....	3	17	9	.....	223	16	2
3.		19	3	13	.....	2	5	10	.....	45	10	6
4.		75	3	25	.....	48	5	.....	.....	183	18	4 $\frac{1}{2}$
5.		2	1	18	.....	59	8	.....	.....	7	3	10
6.		1	1	11	.....	63	9	.....	.....	4	5	11 $\frac{1}{2}$
7.		0	3	19	.....	54	0	.....	.....	2	9	7 $\frac{1}{4}$
8.	37	14	2	14	hemp	89	6	8	per ton	3370	13	2
9.	27	16	3	18	.....	90	10	.....	.....	2520	0	5
10.		15	2	.....	.....	92	5	.....	.....	71	9	10 $\frac{3}{4}$
11.	17	10	2	.....	.....	91	10	.....	.....	1603	10	9

.....

1. What will 37 cwt. 3 qrs. 7 lb. of sugar come to, at 14 dols. 40 cts. per cwt. ?

		14,40
		37
		<hr/>
		10080
		4320
2 qrs.	$\frac{1}{2}$	720
1 qr.	$\frac{1}{4}$	360.
7 lb.	$\frac{1}{4}$	90
		<hr/>
		544,50

Ans. 544 dols. 50 cts.

	Tons.	cwt.	qr.	lb.		dols.	cts.		dols.	cts.
2.	24	18	3	18	of hemp at	289	50	per ton.	Ans.	7221 73
3.	31	16	.....	.....	.....	268	75	.....	.....	8546 25
4.	19	14	2	12	iron	110	.....	.....	.....	2170 33 8
5.	—	17	3	24	cordage	14	per cwt.	.....	.....	251 50
	A. R.	per.				dols.	cts.		dols.	cts.
6.	25	2	25	of land	at	29	per acre.	Ans.	744	3
7.	87	1	37	.....	.....	38	.....	.....	2886	88
8.	229	3	18	.....	.....	18	50	.....	4252	45 $\frac{1}{2}$
9.		3	26	.....	.....	25	.....	.....	22	81

.....

1. How much will 49 M. 3 hund. 25 casts of staves come to, at 17 dols. per M. ?

		49
		17
		<hr/>
		343
		49
2 hund.	$\frac{1}{2}$	3,4
1	$\frac{1}{4}$	1,7
20 casts	$\frac{1}{4}$	,85
5	$\frac{1}{4}$	,212
		<hr/>
		839,162

Ans. 839 dols. 16 cts. 2 ms.

	<i>M. hun. cants.</i>				<i>dols.</i>		<i>dols. cts.</i>
2.	19	8	15	W. O. hhd. staves	31	per M.	Ans. 614 98
3.	22	9	37	R. O. do. do.	13	.....	298 90
4.	28	1	8	W. O. barrel do.	16	.....	449 92
5.	4	2	11	.....	15	.....	63 41

.....

1. What will 8,767 feet of merchantable boards come to, at 38s. 6d. per M. ?

$$\begin{array}{r}
 8,767 \\
 38 \ 6 \\
 \hline
 70136 \\
 26301 \\
 6d. \ \frac{1}{2} \quad 4383 \\
 \hline
 20)337,529 \text{ shillings.} \\
 \hline
 \text{Ans. } \pounds.16 \ 17 \ 6
 \end{array}$$

The fourth figure of the product of the remainder, multiplied by 12, is set down for pence.

		<i>s. d.</i>		<i>£. s. d.</i>
2.	18,370 ft. mer. boards	39 8	per M.	Ans. 36 8 8
3.	2,819 do. do. do.	37 4	.....	5 5 2
4.	,327 do. do. do.	41 0	.....	0 13 5
5.	,183 do. refuse do.	20 6	.....	0 3 9

What is the amount of a seaman's wages from the 15th of March to the 6th of December following, being 8 months and 20 days, at 16 dollars per month ?

$$\begin{array}{r}
 16 \\
 8 \\
 \hline
 128 \text{ for 8 months.} \\
 15 \text{ days} \quad 8 \\
 5 \quad 2,66\frac{2}{3} \\
 \hline
 138,66\frac{2}{3} \quad \text{Ans. 138 dols. } 66\frac{2}{3} \text{ cts.}
 \end{array}$$

NOTE. In calculating the time of seaman's service, either of the days of engaging or being discharged is taken, but not both.

What is the amount of a seaman's wages from 15th of June to the 28th of May following, at 15 dols. per month ?

Ans. 171 dols.

At £.4 11 3 per cwt. what will 3 qrs. 25½ lb. come to ?

		£.4	11	3
2 qrs.	$\frac{1}{2}$	2	5	$7\frac{1}{2}$
1 qr.	$\frac{1}{2}$	1	2	$9\frac{1}{2}$
14 lb.	$\frac{1}{2}$	0	11	$4\frac{7}{8}$
7	$\frac{1}{2}$	0	5	$8\frac{7}{8}$
$3\frac{1}{2}$	$\frac{1}{2}$	0	2	$10\frac{7}{8}$
1	$\frac{1}{4}$	0	0	$9\frac{11}{16}$
<hr/>				
Ans.	£.4	9	$21\frac{25}{32}$	

What will 19 tons, 19 cwt. 3 qrs. 27½ lb. come to, at £.19 19s. 11½d. per ton ?

Ans. £.399 19s. $51\frac{16641}{17920}$.

.....

TARE AND TRET.

TARE and **TRET** are allowances made in selling goods by weight.

Tare is an allowance made to the buyer for the weight of the hogshead, barrel, or bag, containing the commodity.

Tret is an allowance for waste, dust, &c. generally at 4 lb. per 104 lb.

Cluff is an allowance for the turn of the scale, at 2 lb. per 3 cwt.

Gross weight is the whole weight of the goods, together with the hogshead, barrel, or bag, &c. that contains them.

Suttle is when part of the allowance is deducted from the gross.

Neat weight is what remains after all allowances are made.

Custom-house allowances on tea, coffee, and sugar.

Tare on whole chests of lb.		Which tare shall include rope,
bohea tea	70	canvass, and other cover-
.... on every half chest do.	36	ings.
.... on quarter do.	20	
.... on every chest of hy-		Tare for all other boxes of tea,
son, or other green		according to invoice, or act-
teas, the gross wt. of		ual weight thereof.
which is 70 lb. or up-		
wards	20	
.... on every box of other		Tare for coffee in bags 2 per 100
tea, not less than 50		.....in bales 3 do.
lb. or more than 70		.....in casks 12 do.
lb. gross	18	On sugar, other than loaf—
If 80 lb. gross	20	.....in casks 12 do.
And from 80 lb. gross and		.....in boxes 15 do.
upwards	22	.....in bags
		or mats 5 do.

There is an allowance of two per cent. for leakage on the quantity which shall appear to be contained in any cask of liquor subject to duty by the gallon; and ten per cent. on all beer, ale, and porter in bottles, and 5 per cent. on all other liquors in bottles in lieu of breakage, or the duties may be computed on the actual quantity, at the option of the importer, to be made at the time of entry.

EXAMPLES.

1. Sold ten casks of allum, weighing gross 33 cwt. 2 qrs. 15 lb. tare 15 lb. per cask; what is the amount at 23s. 4d. per cwt.?

	cwt.	qr.	lb.	
gross	33	2	15	10 casks.
tare	1	1	10	15 lb. per cask.
neat	32	1	5	112)150

C. 1 1 10 tare.

Ans. £37 13 6½

2. At 1 dol. 25 cts. per lb. what will 3 chests of hyson tea come to, weighing gross 96 lb. 97 lb. and 101 lb.; tare 20 lb. per chest?

Ans. 292 dols. 50 cts.

3. At 9 dols. 49 cts. per cwt. what will 3 hhds. of tobacco come to, weighing gross, viz.

	cwt.	qrs.	lb.	lb.
No. 1.	9	3	25	tare 149
2.	10	2	12	150
3.	11	1	25	158
				Ans. 265 dols. 46½ cts.

4. At 79s. 9d. per cwt. how much will 4 hhds. of madder come to, weighing gross, viz.

	cwt.	qrs.	lb.	
No. 1.	10	3	4	
2.	11	2	13	
3.	10	1	16	
4.	14	3	19	tare 14 lb. per cwt.
44 lb. ½				47 2 24 gross
				5 3 24 tare
				41 3 0 neat.
				Ans. £.166 9 6½.

5. At 62s. per cwt. what will a hhd. of sugar come to, weighing gross 7 cwt. 1 qr.; tare 12 lb. per cwt.? Ans. £.20 1 4.

6. At 21 cents per lb. what will 6 hhds. of coffee come to, weighing gross, viz.

	cwt.	gr.	lb.	lb.
No. 1.	7	1	14	tare 96
2.	8	2	21	98
3.	7	1	24	91
4.	6	3	25	90
5.	7	0	23	89
6.	8	1	12	100
				Ans. 964 dols. 32 cents.

7. What would the above coffee amount to, allowing 12 lb. per cwt. as tare on the gross weight? Ans. 966 dols. 84 cts.

8. At 72s. 6d. per cwt. how much will 8 hhds. of sugar come to, weighing gross each 8 cwt. 3 qrs. 7 lb.; tare 12 lb. per cwt.? Ans. £.228 3 7½.

9. At 23 cents per lb. what will 4 bags of coffee come to, weighing gross 450 lb.; tare 2 per cent. or 2 lb. per 100 lb.? Ans. 101 dols. 43 cents.

10. At 12 dols. 50 cents per cwt. what will 3 barrels of sugar come to, weighing gross, viz.

	cwt.	qrs.	lb.	
No. 1.	2	2	10	
2.	2	1	21	
3.	2	0	15	Tare 21 lb. per barrel.
				Ans. 82 dols. 47 cts. 7 ms.

11. At 15 dols. 40 cts. per cwt. what will 4 hhds. of sugar come to, weighing gross, viz.

No.	cwt. qrs. lb.		
	1	2	3
1.	7	3	13
2.	8	1	10
3.	7	2	12
4.	6	1	21

Tare 12 lb. per cwt.

Ans. 443 dols. 43 cts. 7 ms.

12. A has in his possession a hhd. of sugar, weighing gross 9 cwt. 3 qrs. owned equally between him and B. It is required to know how much sugar he should weigh out to B, allowing tare 12 lb. per cwt. ?

Ans. 4 cwt. 1 qr. 11½ lb.

13. At 19½ cents per lb. what will 2 hhds. of coffee come to, weighing gross 15 cwt. 3 qrs. 11 lb. allowing custom-house tare or 12 lb. per 100 ?

	15	3	11
	<hr/>		
	1500	= fifteen hundred.	
	180	= 15 × 12 for excess in each cwt.	
	84	= three quarters.	
	11	<hr/>	
Gross	1775		1775
Tare	213	Tare	12 per 100.
	<hr/>		<hr/>
Neat	1562		213,00
	19½		
	<hr/>		
	14058		
	1562		
	781		
	<hr/>		
	30459 cts.		Ans. 304 dols. 59 cts.

14. B buys of C a hogshead of Coffee, weighing gross 9 cwt. 2 qrs. tare 12 lb. per cwt. what will it amount to at 23 cents per lb. ?

Ans. 218 dols. 50 cents.

15. If custom-house tare, or 12 lb. per 100, were allowed on the above coffee, what would it amount to, and what difference would it make to the buyer ?

Ans. It amounts to 215 dols. 51 cts. being 2 dols. 99 cts. in his favour.

16. What is the gross weight of a hogshead of tobacco, weighing neat 11 cwt. 1 qr. tare 14 lb. per cwt. ?

Ans. 12 cwt. 3 qrs. 12 lb.

FELLOWSHIP

Is when two or more join their stocks and trade together, dividing their gain or loss, in proportion to each person's share in the joint stock.

SINGLE FELLOWSHIP.

Single Fellowship is when different stocks are employed for a certain equal time.

RULE. As the whole stock is to the whole gain or loss, so is each man's particular stock to his particular share of the gain or loss.

EXAMPLES.

1. A and B buy certain merchandizes, amounting to £.120, of which A pays £.80 and B £.40; and they gain by them £.32—what part of it belongs to each?

A £.80

B 40

As $120 : 32 :: \begin{cases} 80 \\ 40 \end{cases}$ Ans. £.21 6 8 A.
10 13 4 B.

2. A ship worth 8400 dollars being lost at sea, of which $\frac{1}{2}$ belonged to A, $\frac{1}{3}$ to B, and the remainder to C, what loss will each sustain, supposing they have 6000 dollars insured?

Ans. A's loss 600, B's 800, and C's 1000 dols.

3. A and B have gained 1260 dollars, whereof A is to have 10 per cent. more than B, what is the share of each?

Ans. A's 660, B's 600 dols.

4. A bankrupt is indebted to A 500 dols. 37 cts. to B 228 dols. to C 1291 dols. 23 cts. to D 709 dols. 40 cts. and his estate is worth but 2046 dols. 75 cts. how much does he pay per cent. and what is each creditor to receive?

Ans. He pays 75 per cent. and A's part is 375 dols. 27 $\frac{3}{4}$ cts. B's 171 dols. C's 968 dols. 42 $\frac{1}{2}$ cts. and D's 532 dols. 5 cts.

5. Three boys, John, James, and William, buy a lottery ticket for 3 dols. of which John pays 90 cts. James 1 dol. and William the remainder. This ticket is entitled to a prize of 2000 dollars, subject to a deduction of 12 $\frac{1}{2}$ per cent. how much is each to receive?

Ans. John 525 dols. James 583 dols. 33 $\frac{1}{2}$ cts. William 641 dols. 66 $\frac{1}{2}$ cts.

6. Three merchants made a joint stock—A put in £.565 6 8, B £.478 5 4, and C a certain sum, and they gained £.373 9 11, of which C took for his part £.112 11 11—required A and B's part of the gain, and how much C put in?

Ans. A's gain £.141 6 8, B's £.119 11 4, and C put in £.450 7 8.

7. Three men have to share a legacy of 1500 dols. of which B is to have $\frac{1}{2}$, C $\frac{1}{3}$ and D the remainder, but C relinquishes his part to B and D, leaving it to be divided between them, according to their shares in the whole. It is required to know how much of the legacy B and D receive respectively?

Ans. B's part is 1000, D's 500 dols.

.....

DOUBLE FELLOWSHIP.

Double Fellowship is when the stocks are employed for different times.

RULE. Multiply each man's stock by its time, and add them together, then say, As the sum of the products is to the whole gain or loss, so is the product of each man's stock and time to his share of the gain or loss.

EXAMPLES.

1. B and C trade in company, B put in £.950 for 5 months, and C £.785 for 6 months, and by trading they gain £.275 18 4; what is each man's part of the profit?

B's stock $950 \times 5 = 4750$

C's $785 \times 6 = 4710$

As 9460 : 275 18 4 :: $\left\{ \begin{array}{l} 4750 : 1138 \text{ 10 10 B's.} \\ 4710 : 137 \text{ 7 6 C's.} \end{array} \right.$

2. Two merchants enter into partnership for 16 months. A put into stock at first 1200 dols. and at the end of 9 months 200 dols. more, B put in at first 1500 dols. and at the expiration of 6 months took out 500 dols.—with this stock they gained 772 dols. 20 cts. what is each man's part of it?

Ans. A's 401 dols. 70 cts.—B's 370 dols. 50 cts.

3. Two persons hired a coach in Boston, to go 40 miles, for 20 dols. with liberty to take in 2 more when they pleased. Now when they had gone 15 miles, they admit C, who wished to go the same route, and on their return, within 25 miles of Boston, they admit D for the remainder of the journey. Now as each person is to pay in proportion to the distance he rode, it is required to settle the coach-hire between them.

Ans. A and B 6 dols. 40 cts. each, C 5 dols. 20 cts. and D 2 dols.

SIMPLE INTEREST

Is a compensation made by the borrower of any sum of money to the lender, according to a certain rate per cent. agreed on for the principal only.

The legal rate of interest in Massachusetts is 6 per cent.

Principal, is the money lent.

Rate, is the sum per cent. agreed on.

Amount, is the principal and interest added together.

GENERAL RULE. Multiply the principal by the rate per cent. and divide the product by 100, and the quotient is the answer for one year.

EXAMPLES.

1. What is the interest of £.496 for one year at 6 per cent.?

$$\begin{array}{r}
 496 \\
 6 \\
 \hline
 29 \overline{)76} \\
 \underline{20} \\
 15 \overline{)20} \\
 \underline{12} \\
 2 \overline{)40} \\
 \underline{4} \\
 1 \overline{)60}
 \end{array}$$

Ans. 29l. 15s. 2 $\frac{1}{2}$ d.

2. What is the interest of £.383 15 9 for 2 years, at 8 $\frac{1}{2}$ per cent.?

$$\begin{array}{r}
 383 \ 15 \ 9 \\
 8 \frac{1}{2} \\
 \hline
 3070 \ 6 \ 0 \\
 191 \ 17 \ 10 \frac{1}{2} \\
 \hline
 32 \overline{)62 \ 3 \ 10 \frac{1}{2}} \\
 \underline{20} \\
 12 \overline{)43} \\
 \underline{12} \\
 5 \overline{)26} \\
 \underline{4} \\
 1 \overline{)06}
 \end{array}$$

32l. 12s. 5 $\frac{1}{2}$ d. for one year.

Ans. 65 4 10 $\frac{1}{2}$ for 2 years.

3. What will £.826 13 9 amount to in 1 year at 5 per cent.?

5 = $\frac{1}{20}$ 826 13 9 principal.
41 6 $8\frac{1}{2}$ interest.

Ans. £.868 0. $5\frac{1}{2}$ amount.

4. What is the interest of £.103 11 4, for 4 years, at $7\frac{1}{2}$ per cent. per annum?

Ans. £.31 1 $4\frac{1}{2}$.

5. What will £.36 14 9 amount to, in 3 years, at 5 per cent. per annum?

Ans. £.42 4 $11\frac{1}{2}$.

6. What is the amount of £.19 15 8, for 5 years, at $6\frac{1}{2}$ per cent. per annum?

Ans. £.26 9 $1\frac{1}{2}$.

7. How much is the interest of £.72 12 6, for 6 months, at 6 per cent. per annum.

72 12 6
6.

4|35 15 0
20

7|15
12

1|80
4

3|20

l. s. d.
6 m. $\frac{1}{2}$ 4 7 $1\frac{1}{2}$ for 1 year.

Ans. 2 3 $6\frac{1}{2}$ for 6 months.

NOTE. When the time is months, multiplying by the rate for the time gives the answer. This rate is found by multiplying the time by the given rate per cent. for a year, and dividing the product by 12. The quotient is the rate required, and is always equal to half the months when the yearly rate is 6 per cent.

8. What is the interest of £.25 19 3 for 8 months, at 6 per cent. per annum?

8 months.
6

12)48

4 rate = half the months.

25 19 3
4

1,03 17 0
20

9,77
12

9,24

Ans. £.1 0 9.

9. How much will £.53 9 4 amount to, in 20 months, at 6 per cent. per annum? Ans. £.58 16 3.

10. How much is the interest on a bond of £.295 17 10 for 18 months, at 8 per cent. per annum?

18 8	295. 17 10	12 the rate for the time.
12)144	35,50 14 0	
12	20	
	10,14	
	12	
	1,68	
	4	
	2,72	

Ans. 35*l.* 10*s.* 11*d.*

11. How much is the interest of £.80 12 9, for 23 months, at 6 per cent. per annum? Ans. £.9 5 5½.

12. How much is the interest of £.36 14 9 from 19th May to 25th October, at 6 per cent.?

36 14 9	4 m. = $\frac{1}{2}$ 2 4 1 for 1 year.
6	
2,20 8 6	0 14 8½
20	1 m. = $\frac{1}{4}$ 0 3 8
	6 d. = $\frac{1}{8}$ 0 0 8½
4,08	
12	Ans. 0 19 1
1,02	

13. What will £.187 14 9 amount to, from 11th June, 1797, to 26th October, 1798, at 6 per cent. per annum?

Ans. £.203 4 5½.

14. How much is the interest of £.19 13 7 from 3d January, 1797, to 18th May, 1798, at 6 per cent. per annum?

Ans. £.1 12 5½.

To find the interest of any sum for months, at 6 per cent. per annum, by contraction.

RULE. Multiply the pounds by the number of months; the first or units figure of the product is pence, and the rest are shillings, observing to increase the pence in the product by 1 when they exceed 4.

SIMPLE INTEREST.

EXAMPLES.

15. What is the interest of £.56 for 1, 5, 7, and 12 months?

	56	56	56	56
mo.	1	5	7	12
Ans.	5s. 7d..	28s. 0d.	39s. 2d.	67s. 2d.

16.	£. 45	for 6 months.	Ans. £. 1 7 0
17.	324	5	8 2 0
18.	19	7	0 13 3
19.	11	1	0 1 1

If there are Shillings, &c.

To the pounds add the decimal of the nearest even number of shillings (this will be sufficiently exact for business) and multiply by the months as before, separate two figures of the product to the right, and the left hand figures are the shillings, then multiply the figures pointed off, by 12, and the product, rejecting two figures to the right, is the pence of the answer.

2	4	6	8	10	12	14	16	18 shillings.
,1	,2	,3	,4	,5	,6	,7	,8	,9 decimals.

20. How much is the interest of £.347 5 9 for 3 months?

	347,3
	3
shillings	104,19
Ans.	5l. 4s. 2d.

21. How much is the interest of £.195 15 10½ for 10 months?

	195,8	
	10	,80
shillings	195,80	12
		9,60
Ans.	9l. 15s. 9½d.	4
		2,40

The value of the remainder is thus shewn to be 9½d.

22. What is the interest of £.590 19 9 $\frac{1}{2}$ for 3 years, months and 19 days ?

$$\begin{array}{r}
 \text{£.591 nearly.} \\
 43 \\
 \hline
 1773 \\
 2364 \\
 15 \text{ days } \frac{1}{2} \quad 295 \\
 3 \quad \frac{1}{3} \quad 59 \\
 1 \quad \frac{1}{3} \quad 19 \\
 \hline
 2578,6 + 1 \text{ because it exceeds 4--see the Rule} \\
 \hline
 \text{£.128 18 7}
 \end{array}$$

23. How much is the interest of £.476 9 8 for 9 month and 13 days ?

$$\begin{array}{r}
 476,5 \\
 9 \\
 \hline
 4288,5 \\
 19 \text{ days } \frac{1}{2} \quad 158,8 \\
 3 \text{ do. } \frac{1}{10} \quad 47,6 \\
 \hline
 449,49 \\
 \hline
 \text{Ans. £.22 9 5}\frac{1}{2}
 \end{array}$$

24. What is the interest of £.40 for 7 years, 5 months, and 26 days ?

$$\begin{array}{r}
 40 \\
 89 \text{ months.} \\
 \hline
 3560 \\
 15 \text{ days } \frac{1}{2} \quad 20 \\
 10 \text{ do. } \frac{1}{3} \quad 13 \\
 1 \text{ do. } \frac{1}{10} \quad 1 \\
 \hline
 359,4 \\
 \hline
 \text{Ans. £.17 19 5}
 \end{array}$$

25. What is the interest of £.240 for 50 days, at 6 per cent. ?
Or by Compound Proportion..

240	240
6	50
<hr/>	<hr/>
14,40	6083)12000(1
20	6083
<hr/>	<hr/>
8,00	5917
	20
<hr/>	<hr/>
d.	d.
365 : 14l. 8s. :: 50 : 1l. 19s. 5½d.	6083)118340(19
	6083
	<hr/>
	57510
	54747
	<hr/>
	2763
	12
	<hr/>
	6083)33156(5
	30415
	<hr/>
	2741
	4
	<hr/>
	6083)10964(1
	6083
	<hr/>
	4881

Ans. £. 1 19 5½.

SIMPLE INTEREST IN FEDERAL MONEY.

The principal given in English money, and the interest required in federal.

RULE. Reduce the given sum to shillings, the product gives the answer in cents, and the pence are mills nearly ; the reason is, that at 6 per cent. per annum, one fifth of a dollar is the annual interest of a pound ; that is, 20 cents for 20 shillings, or 1 cent for every shilling in any given sum.

EXAMPLES.

1. Required the interest of £.194 15 3 for 1 year in federal money.

194 15 3
20

3895 cents.

Ans. 38 dols. 95 cts. 3 mills.

2. What is the interest of £.129 13 2 for 2 years in federal money?

$$\begin{array}{r}
 129 \ 13 \ 2 \\
 20 \\
 \hline
 2593,2 \text{ for 1 year.} \\
 2 \\
 \hline
 5186,4
 \end{array}$$

Ans. 51 dols. 86 cts. 4 ms.

3. What is the interest of £.91 12 1 for 5 years, in federal money?

$$\begin{array}{r}
 91 \ 12 \ 1 \\
 20 \\
 \hline
 1832,1 \text{ for 1 year.} \\
 5 \\
 \hline
 91,605 \text{ for 5 years.}
 \end{array}$$

Ans. 91 dols. 60½ cts.

4. What is the interest of £.139 17 2 for 4 months?

$$\begin{array}{r}
 139 \ 17 \ 2 \\
 20 \\
 \hline
 4 \text{ mo. } \frac{1}{3} \ 2797,2 \\
 \hline
 9,32,4
 \end{array}$$

Ans. 9 dols. 32 cts. 4 ms.

.....

Principal in federal money, and Interest required in the same.

RULE. Multiply the principal by the rate per cent. and as you suppose 100 for a divisor, point off the quotient as in division of decimals.

The following rule answers the same purpose.

When the principal is dollars only, multiply by the rate, and from the product point off two figures to the right, the figures to the left hand of the point give the answer in dollars, and the rest are decimal parts or cents.

If there are cents, &c. in the principal, multiply by the rate and point off as above. The figures to the left of the point give the answer in the same name with the lowest denomination in the principal.

SIMPLE INTEREST.

EXAMPLES.

5. What is the interest of 419 dollars for 1 year at 6 per cent?

$$\begin{array}{r} 419 \\ 6 \\ \hline \end{array}$$

25,14

Ans. 25 dols. 14 cts.

6. What is the interest of 173 dollars 50 cents for 1 year, at 6 per cent?

$$\begin{array}{r} 173,50 \\ 6 \\ \hline \end{array}$$

Cents 1041,00

Ans. 10 dols. 41 cts.

7. What is the interest of 327 dols. 82 cts. 5 mills, for 1 year, at 8 per cent?

$$\begin{array}{r} 327,82,5 \\ 8 \\ \hline \end{array}$$

mills 26226,00

Ans. 26 dols. 22 cts. 6 ms.

8. How much is the interest of 325 dollars for 3 years, at 6 per cent. per annum?

$$\begin{array}{r} 325 \\ 6 \\ \hline \end{array}$$

Or thus,

$$\begin{array}{r} 325 \\ 18 \text{ rate for the time.} \\ \hline \end{array}$$

19,50 for 1 year.

$$\begin{array}{r} 2600 \\ 325 \\ \hline \end{array}$$

$$\begin{array}{r} 3 \\ \hline \end{array}$$

58,50 for 3 years.

$$\begin{array}{r} 58,50 \\ \hline \end{array}$$

Ans. 58 dols. 50 cts.

.....

When the time is months.

RULE. Multiply by half the number; this, as was before observed, is always equal to the rate, for the time, when the annual rate is 6 per cent. per annum.

EXAMPLES.

9. What is the interest of 284 dollars, for 8 months, at 6 per cent.?

$$\begin{array}{r} 284 \\ 4 \\ \hline \end{array}$$

11,36

Ans. 11 dols. 36 cts.

SIMPLE INTEREST.

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10. How much is the interest of 187 dols. 25 cts. for 16 months, at 6 per cent. per annum ?

$$\begin{array}{r}
 187,25 \\
 \underline{8} \\
 \text{Cents } 1498,00
 \end{array}
 \quad \text{Ans. 14 dols. 98 cts.}$$

11. What is the interest of 95 dollars, for 2 months, at 6 per cent. per annum ?

$$\begin{array}{r}
 95 \\
 \underline{1} \\
 ,95
 \end{array}
 \quad \text{Ans. 95 cents.}$$

12. How much is the interest of 126 dollars, 46 cents, for 9 months, at 6 per cent. ?

$$\begin{array}{r}
 126,46 \\
 \underline{4\frac{1}{2}} \\
 505,84 \\
 \underline{63,23} \\
 \text{Cents } 569,07
 \end{array}
 \quad \text{Ans. 5 dols. 69 cts.}$$

13. How much is the interest of 124 dollars, for 1 month, at 6 per cent. ?

$$\begin{array}{r}
 \frac{1}{2})124 \\
 \underline{62} \\
 ,62
 \end{array}
 \quad \text{Or }
 \begin{array}{r}
 124 \\
 \underline{,5} \\
 ,62,0
 \end{array}
 \quad \text{Ans. 62 cts.}$$

14. What is the interest of 694 dols. 84 cts. for 9 months, at 10 per cent. per annum ?

$$\begin{array}{r}
 694,84 \\
 \underline{10} \\
 \text{Cents } 6948,40 \text{ for a year.}
 \end{array}
 \quad \text{Or }
 \begin{array}{r}
 694,84 \\
 \underline{7\frac{1}{2} = \text{rate for the time.}} \\
 4863,88 \\
 \underline{347,42} \\
 \text{Cents } 52,11,30
 \end{array}$$

$$\begin{array}{r}
 6 \quad \frac{1}{2} \quad 3474,2 \\
 3 \quad \frac{1}{2} \quad 1737,1 \\
 \underline{52,11,3} \\
 52,11,3
 \end{array}
 \quad \text{Ans. 52 dols. 11 cts. 3m.}$$

SIMPLE INTEREST.

15. How much is the amount of 985 dollars, for 5 years and 8 months, at 6 per cent. per annum ?

$$\begin{array}{r}
 \text{dols.} \\
 985 \\
 34 \text{ half the months.} \\
 \hline
 3940 \\
 2955 \\
 \hline
 334,90 \text{ interest.} \\
 985, \text{ principal.} \\
 \hline
 1319,90 \text{ amount.}
 \end{array}$$

▲ Ans. 1319 dols. 90 cts.

.....

When the time is months and days, and the annual rate 6 per cent. Multiply by half the months and one sixth of the days, which is equal to the rate, for the given time, and separate one figure to the right for the decimal in the rate, and proceed as usual. Should there be a remainder in taking a sixth of the days, reduce it to a vulgar fraction; this, and not the decimal, will *always* give the exact rate.

EXAMPLES.

16. What is the interest of 194 dols. for 4 months and 12 days, at 6 per cent. ?

$$\begin{array}{r}
 \text{dols.} \\
 194 \\
 2,2 = \text{to the rate, found by the rule,} \\
 \hline
 388 \\
 388 \\
 \hline
 4,26,8
 \end{array}$$

or the annexed calculation.

$$\begin{array}{r}
 m. \quad m. \\
 12 : 6 :: 4,4 \\
 \quad \quad 6 \\
 \hline
 12)26,4 \\
 \hline
 2,2
 \end{array}$$

Ans. 4 dols. 26 cts. 8 ms.

17. How much is the interest of 263 dollars, 48 cents, for 2 months and 21 days, at 6 per cent. ?

$$\begin{array}{r}
 \text{dols. cts.} \\
 263,48 \\
 1,3\frac{1}{2} \\
 \hline
 79044 \\
 26348 \\
 13174 \\
 \hline
 \text{Cents } 355,698
 \end{array}$$

Ans. 3 dols. 55 cts. 6 ms.

SIMPLE INTEREST.

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18. How much is the interest of 318 dols. for 10 months and 16 days, at 6 per cent. ?

$$\begin{array}{r}
 318 \\
 5,2\frac{2}{3} \\
 \hline
 636 \\
 1590 \\
 \frac{1}{3} \quad 106 \\
 \frac{1}{3} \quad 106 \\
 \hline
 \end{array}$$

dols. 16,74,8

Ans. 16 dols. 74 cts. 8 m.

19. What is the interest of 418 dols. for 1 year, 7 months, and 17 days, at 6 per cent. ?

$$\begin{array}{r}
 418 \\
 9,7\frac{1}{3} \\
 \hline
 2926 \\
 3762 \\
 \frac{3}{8} \text{ or } \frac{1}{2} \quad 209 \\
 \frac{2}{8} \text{ or } \frac{1}{4} \quad 139 \quad \left. \vphantom{\begin{array}{l} 209 \\ 139 \end{array}} \right\} = 348\frac{1}{2}
 \end{array}$$

dols. 40,89,4

Ans. 40 dols. 89 cts. 4 m.

20. How much is the interest of 268 dols. 44 cts. for 3 years, 5 months, and 26 days, at 6 per cent. ?

$$\begin{array}{r}
 268,44 \\
 20,9\frac{1}{3} \\
 \hline
 241596 \\
 536880 \\
 \frac{1}{3} \quad 8948 \\
 \hline
 \end{array}$$

Cents 5619,34,4

Ans. 56 dols. 19 cts. 3 m.

21. What is the interest of 1 dollar, for 18 days, at 6 per cent. ?

$$\begin{array}{r}
 1 \\
 ,3 \\
 \hline
 ,00,3 \text{ mills.}
 \end{array}$$

Ans. 3 mills.

One figure is separated for the decimal in the multiplier, and two cyphers are supplied and pointed, according to the general rule.

22. What is the interest of 910dols. 50 cts. for 3 years, 9 months, and 26 days, at 7 per cent. per annum ?

	910,50	Or thus, 910,50
	<u>7</u>	<u>22,9½</u>
	63,73,50	819,50
	<u>3</u>	182100
	191,20,5 for 3 years.	182100
		<u>30350</u>
6mo. ½	31,86,7	½)208,80,80|0 at 6 per cent.
3 mo. ¼	15,93,3	34,80,1
15 days ⅙	2,65,5	
10 days ⅓	1,77,0	
1 day ⅒	,17,7	
	<u>dols. 243,60,7</u>	<u>dols. 243,60,9 at 7 per cent.</u>
		Ans. 243dols. 60cts. 8ms.

23. How much will 185dols. 26 cts. amount to, in 2 years, 3 months, and 11 days, at 7½ per cent. per annum ?

Ans. 216dols. 94 cts. 4 ms.

24. What is the interest of 57dols. 78 cts. for 1 year, 4 months, and 17 days, at 4 per cent. per annum ?

Ans. 3dols. 19 cts.

25. How much is the amount of 298dols. 59 cts. from 19th May, 1797, to the 11th of August, 1798, at 8 per cent. per annum ?

Ans. 327dols. 98 cts. 4 ms.

26. How much is the amount of 196 dollars, from June 14, 1798, to April 29, 1799, at 5½ per cent. per annum ?

Ans. 205dols. 86 cts.

27. What is the interest of 658 dollars, from January 9 to October 9 following, at ½ per cent. per month ?

Ans. 29dols. 61 cts.

In the calculation of interest in federal money, thus far, the year is supposed to be 12 months of 30 days each, making it only 360 days. Most persons use this method of computing the time, but as it is 5 days less in a year than the true number, some merchants calculate by days, without any regard to months, as being more accurate.

SIMPLE INTEREST.

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EXAMPLES.

28. What is the interest of 7086 dollars, for 39 days, at 6 per cent. per annum?

By Compound Proportion.

$$\begin{array}{r}
 7086 \\
 39 \\
 \hline
 63774 \\
 21258 \\
 \hline
 \text{dols cts.} \\
 6083)276354(45-43. \\
 24332 \\
 \hline
 33034 \\
 30415 \\
 \hline
 26190 \\
 24339 \\
 \hline
 18580 \\
 18249 \\
 \hline
 331
 \end{array}$$

Ans. 45 dols. 43 cts.

29. What is the interest of 87 dols. 56 cts. for 72 days, at 6 per cent. per annum?

$$\begin{array}{r}
 87,56 \\
 72 \\
 \hline
 17512 \\
 61292 \\
 \hline
 \text{cts. m.} \\
 6083)6304,32(103\ 6 \\
 6083 \\
 \hline
 22132 \\
 18249 \\
 \hline
 38830 \\
 36498 \\
 \hline
 2342
 \end{array}$$

Ans. 1 dol. 3 cts. 6 m.

	dols. cts.	for	days.	at 6 per cent. per ann.	Ans.	dols. cts. m.
30.	2962 19		254		Ans.	123 68 8
31.	35		256	.....		1 47 2
32.	1733 97		102	.....		29 7 5
33.	455 52		47	.....		3 51 9
34.	215 80		125	.....		4 43 4
35.	517 90		84	.....		7 15 1
36.	73 63		92	.....		1 11 3

SIMPLE INTEREST.

The following method of calculating the interest upon accounts, when there are partial payments, is sometimes used.

	dols.	days.	Prod. princ. & time.
1798.			
January 2, Lent—	100	on interest for 13	1300
— 15, Lent—	110		
	210	5	1050
— 20, Received	162		
	48	14	672
February 3, Lent—	95		
	143	7	1001
— 10, Received	90		
	53	6	318
— 16, Lent—	186		
	239	10	2390
— 26, Received	70		
	169	3	507
March 1, Lent—	250		
	419	2	838
— 3, Received	270		
	149	10	1490
— 13, Received	143		
20, Time of adjustment	6	7	42
			9608

Then 6083) 9608(
 6083 6, *d.cts.* 1,57 interest at 6 per cent.
 the principal due.
 35250 7,57 the amount due March 20th.
 30415
 48350
 42581
 5769

By this method interest may be calculated on accounts, multiplying each sum by the days it is at interest, and taking the quotient of 36500, divided by the rate per cent. as a fixed divisor to the sum of the products. Thus, the rate in the last example being 6 per cent. the divisor is 6083; for 5 per cent. it would be 7300; for 7 per cent. 5214, &c.

If the time is *months*, multiply each sum by the months it is at interest, and take the quotient of 1200, divided by the rate as a divisor. Thus, for 6 per cent. the divisor is 200; for 5 per cent. 240; for 8 per cent. 150, &c.—(See *Compound Proportion*.)

.....

IN COMPUTING INTEREST ON NOTES, &c.

It has generally been the custom to find the amount of the principal from the time the interest commenced to the time of settlement, and likewise the amount of each payment, and then deduct the amount of the several payments from the amount of the principal.

EXAMPLE.

A, by his note dated April 25th, 1798, promises to pay to B. 774 dols. 76 cts. on demand, with interest to commence 4 months after the date. On this note are the following endorsements:

Received, Oct. 12th, 1798, 260 dols. 19 cts.—Oct. 13th, 1798, 60 dols.—Nov. 2, 1798, 200 dols. And the settlement is made Dec. 15th, 1798.

CALCULATION.

	dols.	cts.
The principal carrying interest from 25th Aug. 1798	774	76
Interest to Dec. 15, 1798	3 m. 20 days	14 20
Amount of the principal	788	96
First payment, Oct. 12th, 1798	260	19
Interest to Dec. 15th, 1798 2 ms. 3 days	2	73
Second payment, Oct. 13th, 1798	60	00
Interest to Dec. 15th, 1798 2 ms. 2 days	0	62
Third payment, Nov. 2, 1798	200	00
Interest to Dec. 15, 1798	1 m. 13 days	1 43
Amount of the payments	524	97
Settlement is made for	Dollars—263	99

RULE established by the Courts of Law in Massachusetts for making up judgments on SECURITIES FOR MONEY, which are upon Interest, and on which partial payments have been endorsed.

COMPUTE the interest on the principal sum, from the time when the interest commenced to the first time when a payment was made, which exceeds either alone or in conjunction with the preceding payments (if any) the interest at that time due : add that interest to the principal, and from the sum subtract the payment made at that time, together with the preceding payments (if any) and the remainder forms a new principal ; on which compute and subtract the interest, as upon the first principal : and proceed in this manner to the time of the judgment. By this Rule, the payments are first applied to keep down the interest ; and no part of the interest ever forms a part of a principal carrying interest.

The following example will illustrate the rule, in which the interest is computed at the rate of 6 per cent. by the year, that being the legal rate of interest in Massachusetts.

A, by his note dated January 1, 1780, promises to pay B 1000 dols. in six months from the date, with interest from the date.

On this note are the following endorsements :

Received, *April 1, 1780, 24 dols.—August 1, 1780, 4 dols.—Dec. 1, 1780, 6 dols.—Feb. 1, 1781, 60 dols.—July 1, 1781, 40 dols.—June 1, 1784, 300 dols.—Sept. 1, 1784, 12 dols.—Jan. 1, 1785, 15 dols. and Oct. 1, 1785, 50 dols.—and the judgment is to be entered Dec. 1, 1790.*

CALCULATION.

	dols.	cts.
The principal sum carrying interest from January 1, 1780	1000	00
Interest to April 1, 1780, 3 months	15	00
	Amount,	1015 00
Paid April 1, 1780, a sum exceeding the interest	24	00
		991 00
Remainder for a new principal	991	00
Interest on 991 dols. from April 1, 1780, to Feb. 1, 1781, (10 mo.)	49	55
	Amount	1040 55
Paid Aug. 1, 1780, a sum less than the interest then due Dls. 4 00	4	00
Paid Dec. 1, 1780, do. do.	6	00
Paid Feb. 1, 1781, do. greater than the interest then due 60 00.	60	00
		70 00

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	dols.	cts.
Remainder for a new principal	970	55
Interest on 970 dols. 55 cts. from Feb. 1, 1781, to July 1, 1781, (5 months)	24	26
Amount	994	81
Paid July 1, 1781, a sum exceeding the interest	40	00
Remainder for a new principal	954	81
Interest on 954 dols. 81 cts. from July 1, 1781, to June 1, 1784, (2 years 11 months)	167	09
Amount	1121	90
Paid June 1, 1784, a sum exceeding the interest	300	00
Remainder for a new principal	821	90
Interest on 821 dols. 90 cts. from June 1, 1784, to Oct. 1, 1785, (1 year 4 months)	65	75
Amount	887	65
Paid Sept. 1, 1784, a sum less than the interest then due, Dls. 12 00		
Paid Jan. 1, 1785, do. do. do. 15 00		
Paid Oct. 1, 1785, do. greater with two last payments than interest then due	50	00
	77	00
Remainder for a new principal	810	65
Interest on 810 dols. 65 cts. from Oct. 1, 1785, to Dec. 1, 1790, the time when judgment is to be entered (5 years 2 months)	251	30
Judgment rendered for the Amount	1061	95

.....

A TABLE,

Shewing the number of Days, from any Day in any Month, to the same Day in any other Month, through the Year.

From	Jan.	Feb.	Mar.	Ap.	May.	Jun.	July.	Aug.	Sep.	Oct.	Nov.	Dec.
To Jan.	365	334	306	275	245	214	184	153	122	92	61	31
Feb.	31	365	337	306	276	245	215	184	153	123	92	62
Mar.	59	28	365	334	304	273	243	212	181	151	120	90
April	90	59	31	365	335	304	274	243	212	182	151	121
May	120	89	61	30	365	335	304	273	242	212	181	151
June	151	120	92	61	31	365	335	304	273	243	212	182
July	181	150	122	91	61	30	365	334	303	273	242	212
Aug.	212	181	153	122	92	61	31	365	334	304	273	243
Sep.	243	212	184	153	123	92	62	31	365	335	304	274
Oct.	273	242	214	183	153	122	92	61	30	365	334	304
Nov.	304	273	245	214	184	153	123	92	61	31	365	335
Dec.	334	303	275	244	214	183	153	122	91	61	30	365

THE USE OF THE TABLE.

Suppose the number of days between the 3d of May and the 3d of November was required; look in the column under May for November, and against that month you will find 184.

If the given days be different, it is only adding or subtracting their inequality to or from the tabular number. Thus, from May 3d to Nov. 17th is $184 + 14 = 198$ days, and from Nov. 17th to May 3d is $181 - 14 = 167$ days.

If the time exceed a year, 365 days must be added; thus from the 4th of February, 1798, to the 4th of Sept. 1799, is $212 + 365 = 577$ days.

NOTE. In leap-years, if the end of the month of February be in the time, one day must be added on that account.

.....

COMPOUND INTEREST

Is that which arises both from the *principal* and *interest*; that is, when the interest on money becomes due, and not paid, it is added to the principal, and interest is calculated on this amount as on the principal before.

RULE. Find the simple interest of the given sum for one year, and add it to the principal, and then find the interest for that amount for the next year, and so on for the number of years required. Subtract the principal from the last amount, and the remainder will be the compound interest.

EXAMPLES.

1. What is the interest of £.246 14s. 6d. for 3 years, at 6 per cent. per annum?

5	$\frac{1}{20}$	246	14	6	} first year's interest.
1	$\frac{1}{2}$	12	6	$8\frac{1}{2}$	
		2	9	4	
5	$\frac{1}{20}$	261	10	$6\frac{1}{2}$	} amount of the first year.
1	$\frac{1}{2}$	13	1	$6\frac{1}{4}$	
		2	12	$3\frac{1}{2}$	
5	$\frac{1}{20}$	277	4	$4\frac{1}{2}$	} amount of the second year.
1	$\frac{1}{2}$	13	17	$2\frac{1}{2}$	
		2	15	$5\frac{1}{4}$	
		293	17	0	} amount of the third year.
		246	14	6	
		47	2	6	compound interest for 3 years.

Ans. £.47 2s. 6d.

2. What is the compound interest of £.760 10s. for 4 years, at 6 per cent. per annum ? Ans. £.199 12s. 2d.

3. How much is the amount of £.128 17s. 6d. for 6 years, at 6 per cent. per annum, compound interest ? Ans. £.182 16 2½.

4. How much is the amount of 500 dollars, for 3 years, at 6 per cent. per annum, compound interest ?

$$\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \\ \hline & 500, \\ & 25, \\ & 5, \end{array} \left. \vphantom{\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \end{array}} \right\} \text{first interest.}$$

$$\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \\ \hline & 530, \\ & 26,50 \\ & 5,30 \end{array} \left. \vphantom{\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \end{array}} \right\} \text{second interest.}$$

$$\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \\ \hline & 561,80 \\ & 28,09 \\ & 5,61\frac{1}{2} \end{array} \left. \vphantom{\begin{array}{r|l} 5 & \frac{1}{20} \\ 1 & \frac{1}{3} \end{array}} \right\} \text{third interest.}$$

595,50½ the amount required. Ans. 595D. 50½c.

5. What is the amount of 629 dols. for 7 years, at 6 per cent. per annum, compound interest ? Ans. 945 dols. 78 cts. 3m.

6. How much is the compound interest of 1256 dols. for 15 years, at 6 per cent. per annum ? Ans. 1754 dols. 6 cts. 6m.

A TABLE shewing the amount of one pound or one dollar for any number of years under 33, at the rates of 5 and 6 per cent. per ann. compound interest.

Years.	5 Rates.	6	Years.	5 Rates.	6
1	1,05000	1,06000	17	2,29201	2,69277
2	1,10250	1,12360	18	2,40662	2,85434
3	1,15762	1,19101	19	2,52695	3,02559
4	1,21550	1,26247	20	2,65329	3,20713
5	1,27628	1,33822	21	2,78596	3,39956
6	1,34009	1,41852	22	2,92526	3,60353
7	1,40710	1,50363	23	3,07152	3,81975
8	1,47745	1,59384	24	3,22510	4,04893
9	1,55132	1,68948	25	3,38635	4,29187
10	1,62889	1,79084	26	3,55567	4,54938
11	1,71034	1,89829	27	3,73345	4,82234
12	1,79585	2,01219	28	3,92013	5,11168
13	1,88565	2,13292	29	4,11613	5,41838
14	1,97993	2,26090	30	4,32194	5,74349
15	2,07892	2,39655	31	4,53804	6,08810
16	2,18287	2,54035	32	4,76494	6,45338

The use of this Table is plain and easy, for multiplying the figures standing against the number of years, by the given principal, the product is the amount required.

EXAMPLES.

7. What is the amount of 500 dollars, for 3 years, at 6 per cent. compound interest?

1,19101 the tabular number for the time.
500 the principal.

595,50500

Ans. 595 dols. 50 cts.

8. A merchant, on inspecting some old accounts in March, 1799, finds a settlement dated March, 1771, by which it appears there is due from him to A. B. £.2 8s. this sum he pays with compound interest at 6 per cent. per annum. The amount of it is required?

5,11168 the tabular number for 28 years.
2,4 the principal with the shillings inserted decimally.

2044672
1022336

£.12,268032
20

s. 5,360640
12

d. 4,327680
4

Ans. 1,310720 Ans. £.12 5s. 4½d. or 40 dols. 89 cts. 3 ms.

Calculated in Federal Money.

5,11168
8 dollars.

dols. 40,89344

Ans. 40 dols. 89 cts. 3 mills, as above.

COMMISSION AND BROKERAGE.

COMMISSION and BROKERAGE are compensations to Factors and Brokers for their respective services.

The method of operation is the same as in Simple Interest.

EXAMPLES.

1. What is the commission on £.596 18 4, at 6 per cent.?

$$\begin{array}{r}
 596 \ 18 \ 4 \\
 \underline{\hspace{1cm}} \\
 35 \ 81 \ 10 \ 0 \\
 \underline{\hspace{1cm}} \\
 20 \\
 \underline{\hspace{1cm}} \\
 16 \ 30 \\
 \underline{\hspace{1cm}} \\
 12 \\
 \underline{\hspace{1cm}} \\
 3 \ 60 \\
 \underline{\hspace{1cm}} \\
 4 \\
 \underline{\hspace{1cm}} \\
 2 \ 40
 \end{array}$$

$$\begin{array}{l}
 \text{Or thus, } £.5 \mid \frac{1}{20} \\
 1 \mid \frac{1}{2}
 \end{array}$$

$$\begin{array}{r}
 596 \ 18 \ 4 \\
 \underline{\hspace{1cm}} \\
 29 \ 16 \ 11 \\
 \underline{\hspace{1cm}} \\
 5 \ 19 \ 4 \frac{1}{2} \\
 \underline{\hspace{1cm}} \\
 £.35 \ 16 \ 3 \frac{1}{2}
 \end{array}$$

Ans. £.35 16 3½

2. What is the commission on 1974 dollars at 5 per cent.?

$$\begin{array}{r}
 1974 \\
 \underline{\hspace{1cm}} \\
 5 \\
 \underline{\hspace{1cm}} \\
 98,70
 \end{array}$$

Ans. 98 dols. 70 cts.

3. What is the commission on £.526 11 5 at 3½ per cent.?

Ans. £.18 8 7

4. What is the commission on £.1258 17 3 at 7½ per cent.?

Ans. £.93 3 1½

5. What is the commission on 2176 dols. 50 cents, at 2½ per cent.?

Ans. 54 dols. 41 cts. 2 m.

6. The sales of certain goods amount to 1873 dols. 40 cts. what sum is to be received for them, allowing 2½ per cent. for commission, and ½ per cent. for prompt payment of the neat proceeds?

Ans. 1821 dols. 99 cts. 9 m.

7. Required the neat proceeds of certain goods amounting to £.456 11 8, allowing a commission of $2\frac{1}{2}$ per cent.

$$\text{£.5 } \overset{1}{\underset{0}{2}} \mid 456 \ 11 \ 8$$

$$\overset{2}{2}\frac{1}{2} \ \frac{1}{2} \mid 22 \ 16 \ 7 \text{ commission at 5 per cent.}$$

$$\underline{11 \ 8 \ 3\frac{1}{2}} \text{ commission at } 2\frac{1}{2} \text{ per cent.}$$

Ans. £.445 3 $4\frac{1}{2}$ neat proceeds.

8. What is the commission on £.1371 9 5 at 5 per cent. ?

Ans. £.68 11 $5\frac{1}{2}$

9. What is the commission on £.1958 at $5\frac{1}{2}$ per cent. ?

Ans. £.107 13 $9\frac{1}{2}$

10. What is the commission on £.1859 7 6 at $\frac{7}{8}$ per cent. ?

Ans. £.16 5 $4\frac{1}{2}$

11. What is the brokerage on 1853 dols. at $\frac{3}{4}$ per cent. ?

Ans. 13 dols. 89 cts. 7 m.

12. What is the brokerage on £.874 15 3 at $\frac{1}{4}$ per cent. ?

Ans. £.2 3 $8\frac{1}{2}$

13. What is the brokerage on 1298 dols. 53 cts. at $\frac{3}{8}$ per cent. ?

1298,53

3

8)3895,59

Dols. 4,86,94

Ans. 4 dols. 86 cts. 9 m.

14. What is the brokerage on £.1321 11 4 at $1\frac{1}{8}$ per cent. ?

Ans. £.14 17 4

15. A factor receives 988 dollars to lay out, after having deducted his commission of 4 per cent. how much will remain to be laid out ?

d.

100

4

d.

d.

If 104 : 100 :: 988 : 950 dols. the answer.

16. A factor has in his hands 3690 dollars, which he is directed to lay out in iron, reserving from it his commission of $2\frac{1}{2}$ per cent. on the purchase ; the iron being 95 dols. per ton : how much did he purchase ?

Ans. 37 tons 17 cwt. 3 qrs. $16\frac{4}{9}$ lb.

INSURANCE.

INSURANCE is an exemption from hazard, by paying, or otherwise securing a certain sum, on condition of being indemnified for loss or damage.

Policy is the name given to the instrument, by which the contract of indemnity is effected between the insurer and insured.

Average loss is 5 per cent. ; that is, if the insured suffer any loss or damage not exceeding 5 per cent. he bears it himself, and the insurers are free.

RULE. The method of operation as in interest.

EXAMPLES.

1. What is the premium of insuring £.924 at 7 per cent. ?
Ans. £.64 13 7
2. What is the premium on 1650 dollars, at 12 per cent. ?
Ans. 198 dols.
3. What is the premium of insuring 1250 dollars, at $7\frac{1}{2}$ per cent. ?
Ans. 93 dols. 75 cts.
4. What is the premium of insuring 4500 dollars, at 25 per cent. ?
Ans. 1125 dols.
5. What is the premium of insuring 1650 dollars, at $15\frac{1}{2}$ per cent. ?
Ans. 255 dols. 75 cts.
6. What is the premium of insuring 1873 dollars, at $\frac{1}{4}$ per cent. ?
Ans. 2 dols. 34 cts. 1 m.
7. What sum is to be received for a policy of 1658 dols. deducting the premium of 23 per cent. ?
Ans. 1276 dols. 66 cts.
8. What sum must a policy be taken out for to cover 1800 dollars, when the premium is 10 per cent. ?

100 Policy.

10 Premium.

90 sum covered. $\begin{matrix} d. & d. & d. \\ \text{If } 90 : 100 :: 1800 \end{matrix}$ Ans. 2000 dols.

Proof, 2000 dollars at 10 per cent.

10

200,00

the policy 2000
the premium 200

sum covered 1800 dols.

9. What sum must a policy be taken out for to cover 3926 dols. 7 cts. when the premium is 6 per cent. ?

Ans. 4176 dols. 67 cts.

GENERAL AVERAGE.

WHATEVER the master of a ship in distress, with the advice of his officers and sailors, deliberately resolves to do, for the preservation of the whole, in cutting away masts or cables, or in throwing goods overboard to lighten his vessel, which is what is meant by jettison or jetson, is in all places, permitted to be brought into a general average, in which all, who are concerned in ship, freight and cargo, are to bear an equal or proportionable part of the loss of what was so sacrificed for the common welfare; and it must be made good by the insurers in such proportions as they have underwritten.

EXAMPLES**OF ADJUSTED AVERAGES.**

1. A loaded ship met with such bad weather, that the master and mariners found it impossible to save her without throwing part of her cargo overboard, which they are authorized to do for preservation. Being thus necessitated, they threw such goods as lay nearest at hand, and lightened the ship of 10 casks of hardware, and 40 pipes of Madeira wine, which they judged sufficient to keep her from sinking. Soon after that the ship arrived at her destined port, and then an average bill was immediately made in order to adjust the loss, and to pay the proprietors of those goods, which were thrown overboard, for the good of the whole.

Average accrued to ship——, for goods thrown overboard for preservation of ship, freight and cargo.

	<i>Dols.</i>
Ship valued at	12000
Freight (wages and victuals deducted)	3000
Thomas Nugent's value of goods	4000
Thomas Morgan's value of goods	2500
James Simpson's value of goods	8500
Andrew Wilson for 40 pipes of wine	4000
Laurence Ward for 10 casks of hard ware	6000

40000

	<i>Dols.</i>
Mr. Andrew Wilson's goods thrown overboard were valued at	4000
Mr. Laurence Ward do	6000

10000

If 40000 give 10000 loss, what loss will 100 give?

Ans. 25 per cent.

The ship must pay to A. W. and L. W. for 12000 dollars, at 25 per cent.	3000
The freight 3000 dollars, at the same rate	750
Thomas Nugent, for 4000 dollars, at the same rate	1000
Thomas Morgan, for 2500 dollars, at the same rate	625
James Simpson, for 8500 dollars, at the same rate	2125
<hr/>	
A. W. and L. W. receive of the owners of the goods saved, and the ship's owners	7500
Their property being insured, the underwriters pay them	2500
<hr/>	
	10000

2. The Sea Horse, capt. Dix, laden with hemp, cordage, and iron, bound from Riga to Boston, ran on shore, coming through the grounds at Elsineur. The captain hired a great number of men, and several lighters, to lighten the ship, and to get her afloat again, which was done; but he was obliged to pay 409 dois. 23 cts. for their assistance. This expense being incurred to preserve both ship and cargo, the average must consequently be general. When the ship arrived at Boston, the captain immediately made a protest and an average bill, which was thus stated:

Average accruing to the ship Sea-Horse from Riga to Boston, in 1799, for assistance in getting off the strand of Elsineur.

	dols.	cts.
For sundry charges paid at the Sound for lighters and assistance in getting off the ship	409	23
Protest and postage	35	37
<hr/>		
	444	60

The ship's freight money	3460
Wages for all the people, 4 ms. and 20 d. 560 }	860
Victuals for ditto	
	<hr/>
	2600

The ship Sea-Horse valued at	12000
Freight valued at	2600
William Jenkins for value of hemp	16000
Daniel Jones for value of cordage	4000
Enoch Flinn for value of iron	2400
<hr/>	
	39000

If 39000 dols. lose 444 dols. 60 cts. what will 100 dols. lose?

Ans. 1 dol. 14 cts.

	dols.	cts.
The ship must bear 12000 dols. at 114 cts. per 100 dols.	136	80
The freight 2600 dols. at the same rate	29	64
William Jenkins for 18000	205	20
Daniel Jones for 4000	45	60
Enoch Flinn for 2400	27	36
	<u>444</u>	<u>60</u>

.....

BUYING AND SELLING STOCKS.

STOCK, in the sense in which it is here used, is a fund established by government or individuals in a corporate capacity, the value of which is variable.

EXAMPLES.

1. What is the amount of 1565 dollars national bank stock, at 134 per cent.?

$$\begin{array}{r}
 1565 \\
 134 \\
 \hline
 6260 \\
 4695 \\
 1565 \\
 \hline
 2097,10
 \end{array}$$

Ans. 2097 dols. 10 cts.

2. What is the amount of 2958 dols. bank stock, at 25 per cent. advance?

$$\begin{array}{r}
 2958 \\
 25 \frac{1}{4} \quad 739,50 \\
 \hline
 3697,50
 \end{array}$$

Ans. 3697 dols. 50 cts.

	dols.		dols.	cts.
3.	6959	of 8 per cent. stock, at 110 per cent.	Ans.	7654,90
4.	1796	6	91½	1643,34
5.	1284	3	54½	696,57
6.	3172	deferred	89	2823,08
7.	1518	state notes	83½	1271,32½
8.	1686	Union Bank	128	2158,08

DISCOUNT

Is the abating of so much money to be received before it is due, as that money, if put at interest, would gain in the same time and at the same rate.

Thus 100 dollars would discharge a debt of 106 dollars payable in 12 months, discount at 6 per cent. per annum, because the 100 dollars received would, if put to interest, regain the 6 dollars discount.

RULE. As 100 dollars, with the interest for the given time, is to 100, so is the given sum to the present worth, and the difference between the present worth and the given sum is the discount.

EXAMPLES.

1. What is the present worth of 450 dols. due in 6 months, discount at 6 per cent. per annum?

$$\begin{array}{r}
 6m. \frac{1}{2} 6 \\
 \hline
 3. \\
 100. \\
 \hline
 103 : 100 :: 450
 \end{array}$$

Ans. 436 dols. 89 cts..

2. How much is the discount of £.308 15s. due in 18 months, at 8 per cent. per annum?

Ans. £.33 1 7 $\frac{1}{2}$

3. What is the present worth of 5150 dols. due in 4 $\frac{1}{2}$ months, discounting at the rate of 8 per cent. per annum, and allowing 1 per cent. for prompt payment?

Ans. 4950 dols.

4. A is to pay 5927 dols. on the 19th of April, 1799, and 4989 dols. the 19th of July following—It is required to know how much money will discharge both sums on the 19th of January, 1799, discounting at 8 per cent. per annum?

Ans. 11569 dols. 43 cts.

Though the discount found by the preceding method is thought to be the sum that should be deducted for present payment in justice to both parties, yet in business the interest for the time is taken for the discount.

DISCOUNT.

EXAMPLES.

5. What ready money will discharge a note of 150 dollars, due in 60 days, allowing legal interest, or 6 per cent. per annum as discount?

$$\begin{array}{r} 150 \\ 1 = \text{half the months.} \\ \hline 1,50 \end{array}$$

150 the debt:
1,50 the interest:

148,50 Ans. 148 dols. 50 cts.

6. Bought goods to the amount of 950 dollars, at 90 days credit, what ready money will discharge it, allowing the interest for the time at 6 per cent. per annum as discount?

Ans. 935 dols. 75 cts. if calculated for 3 months.
935 dols. 95 cts. if calculated for 90 days.

When the interest for the time is allowed as discount, it is presumed that neither party suffers any loss, but the following statement evinces the contrary.

A owes B 100 dollars payable in 12 months, for present payment of which B allows 6 dollars or the interest for the time, and receives 94 dollars; this sum he immediately lends to C for the same space of time, and then receives the amount, being 99 dollars 64 cents, which is 36 cents less than he would have to receive from A, had he left the money in his hands—but if he had allowed A the discount, and not the interest, for the time, he would have received from him 94 dols. 34 cents, and this sum being put to interest, would amount to 100 dols. in one year, which shews that the discount and not the interest, is the just deduction for prompt payment.

But when discount is to be made for present payment, without any regard to time, the interest of the sum, as calculated for a year, is the discount.

EXAMPLES.

7. How much is the discount of 853 dols. at 2 per cent. ?

$$\begin{array}{r} 853 \\ .2 \\ \hline \text{dols. } 17,06 \end{array}$$

Ans. 17 dols. 6 cts.

8. How much money is to be received for 985 dols. 75 cts. discounting 4 per cent. ?

Ans. 946 dols. 32 cts.

.....

BANK DISCOUNT.

THE method used among bankers, in discounting notes, &c. is, to find the interest of the sum, from the date of the note to the time when it becomes due, including the days of grace ; the interest thus found is reckoned the discount. Thus, if a note for 100 dollars, dated the 2d September, be discounted at a bank, for 30 days, the interest of that sum for 33 days being 55 cents, is deducted for discount. It may be asked, why interest for 33 days is calculated on a note for 30, the answer is, that as custom has allowed the borrower three days of grace—that is, though the time of the note expires on the 1st of October (the day of the date being included in the 30 days) he may withhold the payment till the 4th—it is therefore reasonable that he should pay interest for it.

If a note of 100 dollars were discounted at a bank for 60 days, the interest of that sum for 63 days, being 105 cents, would be deducted for the same reason.

In case payment of a note be not convenient at the proper time, a new note must be presented on the day of discount, immediately preceding the expiration of the time, paying the same discount or interest for the time, as before stated. Thus, a note of 100 dollars, dated October 7th, 1800, for 30 days, though it is not payable till November 8th, yet must be replaced by a new note on Tuesday, November 4th, paying at the same time 55 cents. A note of the same date, for 100 dols. for 60 days, though not payable till Monday, December 8th, (including in this time the days of grace) must be replaced by a new note on Tuesday, December 2d, paying likewise 105 cents. In the former case the borrower sustains a loss of 5

days in 30, and in the latter 7 days in 60 by renewing. All Banks have their stated times of discount, generally once in a week. In the preceding cases, the Bank is supposed to discount on Tuesday. Some Banks discount twice a week—others oftener.

The discount of any sum, discounted for 30 or 60 days, is found by multiplying it by one sixth of the days. [*See interest, page 110.*]

EXAMPLES.

1. How much is the interest of 238 dols. discounted for 30 days?

$$\begin{array}{r} 238 \\ ,5\frac{1}{2} = \frac{1}{6} \text{ of } 33 \text{ days.} \end{array}$$

$$\begin{array}{r} 1190 \\ 119 \\ \hline \end{array}$$

$$\hline 1,30,9$$

Ans. 1 dol. 30 cts. 9 m.

2. What is the interest of 564 dols. discounted for 60 days?

$$\begin{array}{r} 564 \\ 1,0\frac{1}{2} = \frac{1}{6} \text{ of } 63 \text{ days.} \end{array}$$

$$\begin{array}{r} 5640 \\ 282 \\ \hline \end{array}$$

$$\hline 5,92,2$$

Ans. 5 dols. 92 cts. 2 ms.

What is the discount of the following sums, viz.

	dols.		dols. cts. ms.
3.	159 discounted for 30 days.	Ans.	0 87 4
4.	273 do.		1 50 1
5.	683 do.		3 75 6
6.	789 do.		4 33 9
7.	2194 do.		12 06 7
8.	219 discounted for 60 days.	Ans.	2 29 9
9.	187 do.		1 96 3
10.	319 do.		3 34 9
11.	658 do.		6 90 9
12.	2169 do.		22 77 4

13. How much is the discount of a debenture of 319 dols. payable in 210 days, discounting for 30 days.

NOTE. 28 days are allowed for a month, interest being calculated as if the note were renewable.

28)210(7 mo.

196

14 days.

319

$,5\frac{1}{2} = \frac{1}{2}$ of 33 days.

159 5

15 9

1,75,4 for 1 month.

7

12,27,8 for 7 months.

14 d. $\frac{1}{2}$ mo. 877

13,15,5

Ans. 13 dols. 15 cts. 5 m.

14. What is the discount of the above sum, discounting for 60 days?

NOTE. As notes are renewable in 56 days, the interest of all securities is calculated accordingly.

56)210(3 discount months.

168

42 days.

319

$1,0\frac{1}{2} = \frac{1}{2}$ of 63 days.

3190

159

3,34,9 for 1 discount mo.

3

10,04,7 for 3 ditto.

1,67,4

83,7

28d. $\frac{1}{2}$ mo.

14 $\frac{1}{2}$

12,55,8

Ans. 12 dols. 55 cts. 8 m.

The preceding examples shew the difference between discounting for 30 and 60 days.

What is the discount of the following sums, discounting for 30 days ?

	dols.	days.		dols.	cts.	ms.
15.	187	for 79		Ans.	2	90 0
16.	219	.... 115	.....		4	94 5
17.	658	.... 47	.....		6	7 4
18.	2169	.... 128	.....		54	53 2

What is the discount of the following sums, discounting for 60 days ?

	dols.	days.		dols.	cts.	ms.
19.	187	for 79		Ans.	2	76 8
20.	219	.... 115	.....		4	72 2
21.	658	.... 47	.....		5	79 8
22.	2169	.... 128	.....		52	5 4

When a note is offered at a bank for discount, two endorsers are generally required, to the first of whom it is said to be payable : Thus—A having occasion for a sum of money, procures B and C as endorsers to his note, and offers it for discount in the following form :

100 Dollars.

For value received, I promise to pay B, or order, at the ———
Bank, on demand, one hundred dollars, with interest after ———
days. A.

When state notes, bank shares, &c. are lodged in a bank as security for monies, a note is presented in this form :

For value received, I promise to pay the President, Directors
and Company of the ——— Bank, or their order, at said Bank, on
demand, ——— dollars, with interest after ——— days. C. D.

.....

EQUATION OF PAYMENTS.

THE design of this Rule is to find a mean time for the payment of several sums due at different times.

RULE. Multiply each sum by its time, and divide the sum of the products by the whole debt ; the quotient is accounted the mean time.

EXAMPLES.

1. A owes B 200 dols. whereof 40 dols. is to be paid in 3 months, 60 dols. in 5 months, and the remainder in 10 months, at what time may the whole be paid without any injustice to either?

$$\begin{array}{r}
 \text{dols.} \quad \text{mo.} \\
 40 \times 3 = 120 \\
 60 \times 5 = 300 \\
 100 \times 10 = 1000 \\
 \hline
 200 \quad 200 \overline{)1420}
 \end{array}$$

7 months and 3 days.

2. A is indebted to B £.120, whereof one half is to be paid in 3 months, one quarter in 6 months, and the remainder in 9 months, what is the equated time for the payment of the whole?

Ans. 5 months and $7\frac{1}{2}$ days.

3. C owes D 1400 dols. to be paid in 3 months, but D being in want of money, C pays him, at the expiration of 2 months, 1000 dols. how much longer than 3 months ought C, in equity, to defer the payment of the rest?

Ans. $2\frac{1}{2}$ months.

Those who are exact in these calculations, find the present worth of each particular sum, then find on what time these present worths will be increased to the total of the particular sums payable at the particular times to come; and that is the true equated time for the payment of the whole.

.....

B A R T E R

Is the exchanging of one commodity for another on such terms as may be agreed on.

EXAMPLES.

1. How many quintals of fish, at 2 dols. per quintal will pay for 140 hhds. of salt, at 4 dols. 70 cts. per hhd.?

$$\begin{array}{r}
 140 \\
 4,70 \\
 \hline
 9800 \\
 560
 \end{array}$$

If $\begin{array}{c} \text{dols.} \\ 2 \end{array} : \begin{array}{c} \text{qtl.} \\ 1 \end{array} :: 658,00 \text{ the amount of the salt.}$

Ans. 329 quintals.

2. A buys of B 4 hhds. of rum containing 410 gallons, at 1 dol. 17 cts. per gallon ; and 253 lb. of coffee, at 21 cts. per lb. in part of which he pays 21 dollars in cash, and the balance in boards, at 4 dols. per thousand ; how many feet of boards did the balance require ?

Ans. 127957½ feet.

3. B has C's note for 250 dols. with 6 months interest due on it, and to redeem it C delivers him 60 bushels of wheat at 7s. 6d. per bushel, 50 bushels of corn at 5s. 3d. per bushel, and the balance in staves at 30 dols. per thousand ; what number of staves did B receive ?

Ans. 5550 staves, or 4 m. 6 hun. and 10 casts.

4. B bought of D the hull of a schooner of 70 tons, at 16 dols. per ton, and paid him in cash 500 dols. 3 hhds. of molasses containing 350 gallons, at 64 cts. and is to pay the balance in New-England rum at 74 cts. per gallon ; how many gallons is D to receive ?

Ans. 535½ gals.

5. A buys of B 250 quintals of fish, at 25s. per quintal ; in payment B takes 100 dols. in cash, 2 hhds. of molasses containing 87 and 92 gals. at 3s. 8d. per gallon, 1 pipe of brandy containing 120 gals. at 7s. 6d. per gallon, and gives 3 months credit for the remainder ; required the balance due, and what cash would pay it, allowing the interest of it for the time at 6 per cent. per annum, as discount for prompt payment ?

Ans. Balance is 682 dols. 27 cts. 6 ms. = 672,04,2 in cash.

6. C sells to D 28,674 feet of boards at 8 dols. 50 cts. per thousand, and takes in payment ½ cash, 4 barrels N. E. rum containing 128 gallons at 78 cts. per gallon, 1 barrel of sugar weighing neat 2 cwt. 2 qrs. 4 lb. at 10 dollars per cwt. and the balance in coffee at 25 cts. per lb. ; how much money and coffee is C to receive ?

Ans. 81 dols. 24 cts. 3 ms. and 149½ lb. of Coffee.

7. C has nutmegs worth 7s. 6d. per lb. in ready money, but in barter he will have 8s. ; D has tobacco worth 9d. per lb. ; how much must he rate it per lb. that his profit may be equal to C's ?

Ans. 9½d.

8. A has tea which he barter with B at 10d. per lb. more than it cost him, against cambrick which stands B in 10s. per yard, but he puts it at 12s. 6d. ; I would know the first cost of the tea ?

Ans. 3s. 4d. per lb.

9. A has 240 bushels of rye, which cost him 90 cts. per bushel ; this he barter with B at 95 cts. for wheat that stands B in 99 cts. per bushel ; how many bushels of wheat is he to

receive in barter, and at what price is it to be rated, that their gains may be equal ?

Ans. $218\frac{38}{109}$ bushels, at $104\frac{1}{2}$ cts. per bushel.

10. A and B barter some goods—A put his at $30\frac{6}{5}$ shillings, and gains 8 per cent. B puts his at $24\frac{3}{10}$ shillings, and gains at the same rate ; what was the first cost of the goods ?

Ans. 28s. and 22s. 6d.

11. A and B barter ; A has cloth that cost 28d. B's cost him 22d. and he puts it at 25d. ; how high must A put his to gain 10 per cent. more than B ?

Ans. 35d.

12. C and D barter—C makes of 7s. 6s. 8d. D makes of 7s. 6d. 7s. 3d. ; who has lost most, and by how much per cent. ?

Ans. C loses $1\frac{1}{2}$ per cent. more than D.

.....

LOSS AND GAIN

Is a rule that discovers what is gained or lost in buying or selling goods, and instructs merchants and traders to raise or fall the price of their goods so as to gain or lose so much per cent. &c.

EXAMPLES.

1. Bought a piece of broadcloth containing 53 yards, at 4 dols. 65 cts. per yard, and sold at 5 dols. per yard ; what is the profit on the whole ?

$$\begin{array}{rcl}
 & \text{dols. cts.} & \\
 & 5 & \\
 & 4,65 & \\
 \text{If } 1 \text{ yd.} & : & 35 \\
 & : & 53 \\
 & : & 35 \\
 & : & 265 \\
 & : & 159 \\
 & : & 18,55
 \end{array}
 \quad \text{Ans. 18 dols. 55 cts.}$$

2. If 1 lb. of coffee cost 28 cts. and is sold for 31 cts. what is the profit on 3 bags, weighing 293 lbs. neat ?

Ans. 8 dols. 79 cts.

3. Bought a piece of baize of 42 yards, for £.4 14 6, and sold it at 2s. 6d. per yard; what is the gain or loss on the whole piece?

Ans. 10s. 6d. gain.

4. A merchant bought 59 cwt. 3 qr. 14 lb. of iron, at 112 dols. per ton, paid freight and charges, 24 dols. what is the gain or loss, if he sells the whole at 37s. 4d. per cwt.?

Ans. 13 dols. 26 cts. gain.

5. If a gallon of wine cost 6s. 8d. and is sold for 7s. 2d. what is the gain per cent.?

	7	2	
	6	8	
s. d.	<hr style="width: 50px; margin: 0 auto;"/>		£.
If 6 8	:	6	:: 100

Ans. $7\frac{1}{2}$ per cent. gain.

6. When 20 per cent. loss is made on coffee, sold at 20 cts. per lb. what was the first cost?

Ans. 25 cts.

7. At $13\frac{1}{2}$ cts. profit on the dollar, how much is it per cent.?

Ans. $13\frac{1}{2}$ per cent. or 13 dols. 50 cts. per 100 dols.

8. A trader sells his goods at $2\frac{1}{2}$ d. profit on the shilling, how much is it per cent.?

Ans. $20\frac{2}{3}$, or £.20 16 8

9. Which is the better bargain, in purchasing fish, 17 shillings per quintal, and 4 months credit, or 16s. 8d. cash?

Ans. They are alike.

PROOF. The present worth of 17s. found by discount, is equal to 16s. 8d. and 16s. 8d. with 4 months interest, will amount to 17s.

10. A bought a piece of shalloon, containing 34 yards, at 3s. 4d. per yard, and sold it at $12\frac{1}{2}$ per cent. loss, how much did he sell it per yard?

Ans. 2s. 11d.

11. Bought rum at 90 cts. per gallon, at what rate must it be sold to gain 20 per cent.?

Ans. 108 cents.

12. A trader bought 1 hhd. of rum, of a certain proof, containing 115 gallons, at 1 dol. 10 cts. per gallon, how many gallons of water must he put into it to gain 5 dollars, by selling it at 1 dollar per gallon?

Ans. $16\frac{1}{2}$ gallons.

13. Bought 4 hhds. of rum, containing 450 gallons, at 1 dol. per gallon, and sold it at 1 dol. 20 cts. per gallon, and gave 3 months credit; now allowing the leakage of the rum while in my possession to be 10 gallons, I would know the gain or loss, discounting for the present worth of the debt at 6 per cent. per annum?

Ans. 70 dols. 19 cts. gain.

14. A vintner buys 596 gallons of wine, at 6s. 3d. per gallon, in ready money, and sells it immediately at 6s. 9d. per gallon, payable in 3 months, how much is his gain or loss, supposing he allows the interest for the time, at 6 per cent. per annum, as discount for present payment? Ans. £.11. 17 8 gained.

15. What would be the gain or loss on the aforesaid wine, supposing the discount for present payment to be made at 2 per cent. without any regard to time? Ans. £.10 17 6½ gain.

16. A merchant bought a parcel of cloth at the rate of 1 dol. for every 2 yds. of which he sold a certain quantity at the rate of 3 dols. for every 5 yds. and then found he had gained as much as 18 yards cost, how many yards did he sell? Ans. 90 yds.

17. Bought rum at 1 dol. 25 cts. per gallon, which not proving so good as I expected, I am content to lose 18 per cent. by it, how must I sell it per gallon? Ans. 1 dol. 2½ cts.

18. H sells a quantity of corn at 1 dollar a bushel, and gains 20 per cent. some time after he sold of the same, to the amount of 37 dols. 50 cts. and gained 50 per cent. how many bushels were there in the last parcel, and at what rate did he sell it per bushel? Ans. 30 bushels, at 1 dol. 25 cts. per bushel.

19. A distiller is about purchasing 10000 gallons of molasses, which he can have at 48 cents per gallon, in ready money, or 50 cents with 2 months credit, it is required to know which is more advantageous to him, either to buy it on credit, or to borrow the money at 8 per cent. per annum to pay the cash price? Ans. He will gain 136 dols. by paying the cash.

20. A tobacconist buys 4 hogsheads of tobacco weighing 38 cwt. 2 qrs. 8 lb. gross, tare 9½ lb. per hhd. at 9 dols. per cwt. ready money, and sells it at 11½d. per lb. allowing tare at 14 lb. per cwt. to receive two-thirds in cash, and for the remainder a note at 90 days credit; his gain or loss is required, supposing the note is discounted at a bank where discount is made for 60 days. Ans. 283 dols. 43 cts. gain.

ALLIGATION MEDIAL

Is when the quantities and prices of several things are given, to find the mean price of the mixture compounded of those things.

RULE. As the sum of the quantities or whole composition is to their total value, so is any part of the composition to its mean price.

EXAMPLES.

1. A grocer would mix 25 lb. of raisins, at 8 cents per lb., and 35 lb. at 10 cents per lb. with 40 lb. at 12 cents per lb.—what is 1 lb. of this mixture worth?

lb.	cts.	cts.
25	at 8	200
35	..... 10	350
40	..... 12	480
<hr/>		<hr/>
100		1030
lb.	cts.	lb.
If 100	: 1030	:: 1
	1	
	<hr/>	
	100)1030	
	<hr/>	
	cts. 10,3	

Ans. 10 cents, 3 mills.

2. A goldsmith mixes 8 lb. $5\frac{1}{2}$ oz. of gold, of 14 carats fine, with 12 lb. $8\frac{1}{2}$ oz. of 18 carats fine; what is the fineness of this mixture?

Ans. $16\frac{51}{7}$ carats.

3. A grocer would mix 12 cwt. of sugar, at 10 dols. per cwt., with 3 cwt. at $8\frac{2}{3}$ dols. per cwt. and 8 cwt. at $7\frac{1}{2}$ dols. per cwt. what will 5 cwt. of this mixture be worth?

Ans. 44 dols. 78 cts. 2 ms.

4. A refiner melts $2\frac{1}{2}$ lb. of gold, of 20 carats fine, with 4 lb. of 18 carats fine; how much alloy must he put to it to make it 22 carats fine?

Ans. It is not fine enough by $3\frac{3}{13}$ carats, so that no alloy must be put to it, but more gold.

5. A malster mingles 30 quarters of brown malt, at 28s. per quarter, with 46 quarters of pale, at 30s. per quarter, and 24 quarters of high dried ditto, at 25s. per quarter; what is the value of 8 bushels of this mixture? Ans. £.1 8s. $2\frac{1}{2}d.\frac{2}{3}$

6. If I mix 27 bushels of wheat, at 5s. 6d. the bushel, with the same quantity of rye, at 4s. per bushel, and 14 bushels of barley, at 2s. 8d. per bushel, what is the worth of a bushel of this mixture?
 Ans. 4s. $3\frac{2}{3}d.$

7. A grocer mingled 3 cwt. of sugar, at 56s. per cwt. 6 cwt. at £.1 17 4 per cwt. and 3 cwt. at £.3 14 8 per cwt., what is 1 cwt. of this mixture worth?
 Ans. £.2 11 4

8. A mealman has flour of several sorts, and would mix 3 bushels at 3s. 5d. per bushel, 4 bushels at 5s. 6d. per bushel, and 5 bushels at 4s. 8d. per bushel, what is the worth of a bushel of this mixture?
 Ans. 4s. $7\frac{1}{2}d.$

9. A vintner mixes 20 gallons of Port, at 5s. 4d. per gallon, with 12 gallons of White wine, at 5s. per gallon, 30 gallons of Lisbon, at 6s. per gallon, and 20 gallons of Mountain, at 4s. 6d. per gallon, what is a gallon of this mixture worth?
 Ans. 5s. $3\frac{1}{2}d.$

10. A farmer mingled 20 bushels of wheat, at 5s. per bushel, and 36 bushels of rye, at 3s. per bushel, with 40 bushels of barley, at 2s. per bushel, I desire to know the worth of a bushel of this mixture?
 Ans. 3s. 3d.

11. A person mixing a quantity of oats, at 2s. 6d. per bushel, with the like quantity of beans, at 4s. 6d. per bushel, would be glad to know the value of 1 bushel of that mixture?
 Ans. 3s. 6d.

12. A refiner having 12 lb. of silver bullion of 6 oz. fine, would melt it with 8 lb. of 7 oz. fine, and 10 lb. of 8 oz. fine, required the fineness of 1 lb. of that mixture?
 Ans. 6 oz. 18 dwt. 16 grs.

13. If with 40 bushels of corn, at 4s. per bushel, there are mixed 10 bushels, at 6s. per bushel, 30 bushels, at 5s. per bushel, and 20 bushels, at 3s. per bushel, what will 10 bushels of that mixture be worth?
 Ans. £.2 3s.

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ALLIGATION ALTERNATE

Is the method of finding what quantity of any number of simples, whose rates are given, will compose a mixture of a given rate; so that it is the reverse of Alligation Medial, and may be proved by it.

RULE. 1. Write the rates of the simples in a column under each other.

2. Connect or link with a continued line the rate of each simple which is less than that of the compound, with one, or any number, of those that are greater than the compound, and each greater rate with one or any number of the less.

3. Write the difference between the mixture rate and that of each of the simples, opposite the rates with which they are linked.

4. Then if only one difference stand against any rate, it will be the quantity belonging to that rate; but if there be several, their sum will be the quantity.

EXAMPLES.

1. A merchant would mix wines at 14*s.* 19*s.* 15*s.* and 22*s.* per gallon, so that the mixture may be worth 18*s.* the gallon; what quantity of each must be taken?

18	{	14	|	4 at 14 <i>s.</i>
		15		1 at 15 <i>s.</i>
		19		3 at 19 <i>s.</i>
		22		4 at 22 <i>s.</i>

Or thus,

18	{	14	|	1 + 4	5 at 14 <i>s.</i>
		15		1	1 at 15 <i>s.</i>
		19		4 + 3	7 at 19 <i>s.</i>
		22		4	4 at 22 <i>s.</i>

NOTE. Questions in this rule admit of a great variety of answers, according to the manner of linking them.

2. How much wine, at 6*s.* per gallon, and at 4*s.* per gallon, must be mixed together, that the composition may be worth 5*s.* per gallon? **Ans.** 1 qt. or 1 gall. of each, &c.

3. How much corn, at 2*s.* 6*d.* 3*s.* 8*d.* 4*s.* and 4*s.* 8*d.* per bushel, must be mixed together, that the compound may be worth 3*s.* 10*d.* per bushel?

Ans. 12 at 2*s.* 6*d.* 12 at 3*s.* 8*d.* 18 at 4*s.* and 18 at 4*s.* 8*d.*

4. A goldsmith has gold of 17, 18, 22 and 24 carats fine; how much must he take of each to make it 21 carats fine?

Ans. 3 of 17, 1 of 18, 3 of 22, and 4 of 24.

5. It is required to mix brandy at 8s. wine at 7s. cider at 1s. and water together, so that the mixture may be worth 5s. per gallon?

Ans. 9 gals. of brandy, 9 of wine, 5 of cider, and 5 of water.

When the whole composition is limited to a certain quantity.

RULE. Find an answer as before by linking; then say, As the sum of the quantities, or differences thus determined, is to the given quantity, so is each ingredient, found by linking, to the required quantity of each.

EXAMPLES.

6. How many gallons of water must be mixed with wine worth 3s. per gallon, so as to fill a vessel of 100 gallons, and that a gallon may be afforded at 2s. 6d.?

$$\begin{array}{r} 30 \left\{ \begin{array}{l} 0 \text{ --- } 6 \\ 36 \text{ --- } 30 \end{array} \right. \\ \hline 36 \end{array}$$

$$36 : 100 :: 6$$

$$\begin{array}{r} 36 \overline{) 600} (16 \\ \underline{36} \\ 240 \\ \underline{216} \\ 24 \end{array}$$

$$36 : 100 :: 30$$

$$\begin{array}{r} 36 \overline{) 3000} (83 \\ \underline{288} \\ 120 \\ \underline{108} \\ 12 \end{array}$$

Ans. $83\frac{1}{3}$ gallons of wine, and $16\frac{2}{3}$ of water.

7. A grocer has currants at 4d. 6d. 9d. and 11d. per lb. and he would make a mixture of 240 lb. so that it might be afforded at 8d. per lb. how much of each sort must he take?

Ans. 72 lb. at 4d. 24 at 6d. 48 at 9d. and 96 at 11d.

8. How much gold of 15, of 17, of 18, and of 22 carats fine, must be mixed together, to form a composition of 40 oz. of 20 carats fine?

Ans. 5 oz. of 15, of 17, and of 18, and 25 oz. of 22.

When one of the ingredients is limited to a certain quantity.

RULE. Take the difference between each price and the mean rate, as before ; then,

As the difference of that simple, whose quantity is given, is to the rest of the differences severally, so is the quantity given, to the several quantities required.

EXAMPLES.

9. How much wine, at 5*s.* at 5*s.* 6*d.* and at 6*s.* the gallon, must be mixed with three gallons, at 4*s.* per gallon, so that the mixture may be worth 5*s.* 4*d.* per gallon ?

$$\begin{array}{rcl}
 64 \left\{ \begin{array}{l} 48 - \\ 60 - \\ 66 - \\ 72 - \end{array} \right. & \begin{array}{c} \boxed{} \\ \boxed{} \\ \boxed{} \\ \boxed{} \end{array} & \begin{array}{l} 8+2=10 \\ 8+2=10 \\ 16+4=20 \\ 16+4=20 \end{array} \\
 10 : 10 :: 3 : 3 \\
 10 : 20 :: 3 : 6 \\
 10 : 20 :: 3 : 6
 \end{array}$$

Ans. 3 gallons at 5*s.* ; 6 at 5*s.* 6*d.* and 6 at 6*s.*

10. A grocer would mix teas at 12*s.* 10*s.* and 6*s.* with 20 lb. at 4*s.* per lb. ; how much of each sort must he take to make the composition worth 8*s.* per lb. ?

Ans. 20 lb. at 4*s.* ; 10 lb. at 6*s.* ; 10 lb. at 10*s.* ; and 20 lb. at 12*s.*

11. How much gold of 15, of 17, and of 22 carats fine, must be mixed with 5 oz. of 18 carats fine, so that the composition may be 20 carats fine ?

Ans. 5 oz. of 15 carats fine, 5 oz. of 17, and 25 of 22.

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POSITION.

POSITION is a rule, which, by false or supposed numbers, taken at pleasure, discovers the true one required. It is divided into two parts, **SINGLE** and **DOUBLE**.

SINGLE POSITION

Is, by using one supposed number, and working with it as the true one, you find the real number required by the following.

RULE. As the total of the errors is to the given sum, so is the supposed number to the true one required.

PROOF. Add the several parts of the result together, and if it agrees with the given sum, it is right.

EXAMPLES.

1. A school-master, being asked how many scholars he had, said, If I had as many, half as many, and one quarter as many more, I should have 264 ; how many had he ?

Suppose he had 72

As many 72

$\frac{1}{2}$ as many 36

$\frac{1}{4}$ as many 18

As 198 : 264 :: 72

	72	
	<hr/>	
	528	Proof.
	1848	96
	<hr/>	96
		48
198)19008(96 Answer.		24
	1782	<hr/>
	<hr/>	264
	1188	
	1188	
	<hr/>	

2. A person, after spending $\frac{1}{3}$ and $\frac{1}{4}$ of his money, had 60 dollars left ; what had he at first ? Ans. 144 dols.

3. A certain sum of money is to be divided between 4 persons, in such a manner, that the first shall have $\frac{1}{3}$ of it, the second $\frac{1}{4}$, the third $\frac{1}{6}$, and the fourth the remainder, which is 28 dollars ; what was the sum ? Ans. 112 dols.

4. A person lent his friend a sum of money unknown, to receive interest for the same, at 6 per cent. per annum, simple interest, and at the end of 5 years he received for principal and interest 644 dollars 80 cents ; what was the sum lent ? Ans. 496 dols.

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DOUBLE POSITION

Is, by making use of two supposed numbers, which, if both prove false, are, with their errors, to be thus disposed :

RULE. 1. Place each error against its respective position.

2. Multiply them cross wise.

POSITION.

3. If the errors are alike, that is, both greater or both less than the given number, divide the difference of the products by the difference of the errors, and the quotient is the answer : But if the errors be unlike, divide the sum of the products by the sum of the errors, and the quotient will be the answer.

EXAMPLES.

1. B asked C how much his horse cost; C answered, that if he cost him three times as much as he did, and 15 dollars more, he would stand him in 300 dollars; what was the price of the horse?

<i>dols.</i>	<i>dols.</i>
Suppose he cost 90	Suppose he cost 96
3	3
270	288
15	15
285 too lit. by 15 dls.	303 too much by 3 dls.
90	15
X	
96	34
15	270
3	270
Sum of the errors 18) 1710 (95 answer	95
162	3
90	285
90	15
	300 proof.

2. Two persons, A and B, have both the same income; A saves one-fifth of his yearly: but B, by spending 150 dollars per annum, more than A, at the end of 8 years finds himself 400 dollars in debt; what is their income, and what does each spend per annum?

Ans. Their income is 500 dollars per annum; also A spends 400, and B 550 dollars per annum.

3. There is a fish whose head is 9 inches long, and his tail is as long as his head and half his body, and his body is as long as the head and tail; what is the whole length of the fish?

Ans. 6 feet.

4. Divide 13 into two such parts, so that when the greater is multiplied by 4, and the less by 16, the products will be equal. Ans. 12 and 3.

5. A man had two silver cups of unequal weight, having one cover to both, 5oz.; now if the cover is put on the less cup it will be double the weight of the greater cup, and put on the greater cup it will be three times as heavy as the less cup: what is the weight of each cup? Ans. 3 oz. less—4 oz. greater.

6. A person being asked, in the afternoon, what o'clock it was, answered that the time past from noon was equal to $\frac{2}{3}$ of the time to midnight; required the time?

Ans. 36 minutes past one.

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EXCHANGE.

EXCHANGE is the paying of money in one place or country, for the like value to be received in another place or country.

There are two kinds of money, viz. Real, and Imaginary.

Real money is a piece of metal coined by the authority of the State, and current at a certain price, by virtue of the said authority, or of its own intrinsic value.

Imaginary money is a denomination used to express a sum of money of which there is no real species, as a *livre* in France, a *pound* in America, because there is no species current, in this or that country, precisely the value of either of the sums.

Par of Exchange is the intrinsic value of the money of one country compared with that of another country, as one pound sterling is equal to thirty-five shillings Flemish.

Course of Exchange is the current or running price of exchange, which is sometimes above, and sometimes below par, varying according to the occurrences of trade, or demand for money. Of this course, there are tables published daily in commercial cities: thus by Lloyd's List, of 3d. December, 1799, the course of exchange between Hamburgh and London, was 32s. 6½d. Flemish, per pound sterling, being 2s. 5½d. under par, or loss to London.

EXCHANGE. GREAT-BRITAIN.

The money of account is pounds, shillings, pence and farthings.

The English Guinea is 21 shillings, Sterling.

Weights and measures generally as in the United States.

The United States dollar is equal to 4s. 6d. Sterling.

To change Sterling to Federal money.

RULE. Annex three cyphers to the sum (if pounds only) and multiply it by 4; this product divide by 9, and you have the answer in cents. If there be shillings, &c. the usual method is to reduce it to Massachusetts money, by adding one third to it, and then reduce this sum to Federal.

EXAMPLES.

1. Change £.48 Sterling to Federal.

$$\begin{array}{r}
 48000 \\
 \underline{4} \\
 9 \overline{)192000} \\
 \hline
 21333\frac{1}{3} \text{ cents.} \quad \text{Ans. 213 dols. } 33\frac{1}{3} \text{ cts.}
 \end{array}$$

2. Change £.389 17 4½ Sterling to Federal, exchange at 33½ per cent. that is, £.133½ Massachusetts for £.100 Sterling.

$$\begin{array}{r}
 \frac{1}{3} \overline{)389 \ 17 \ 4\frac{1}{2}} \text{ Sterling} \\
 \underline{129 \ 19 \ 1\frac{1}{2}} \text{ Exchange} \\
 519 \ 16 \ 6 \text{ Massachusetts} \\
 \hline
 3 \overline{)519,825}
 \end{array}$$

Cts. 173275 Federal. Ans. 1732 dols. 75 cts.

NOTE. Sterling is changed to Massachusetts money by adding one-third to the sum, and Massachusetts to Sterling by deducting one-fourth from it.

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To change Federal Currency to Sterling.

RULE. Work by either of the following methods.

EXCHANGE.

147

EXAMPLES.

Change 1732 dollars 75 cents to sterling.

First Method.

$$\begin{array}{r}
 1732 \\
 \hline
 4s. \quad \frac{1}{2} \quad 346 \quad 8 \\
 6d. \quad \frac{1}{8} \quad 43 \quad 6 \\
 50 \text{ cents} \quad 2 \quad 3 \\
 25 \text{ cents} \quad 1 \quad 1\frac{1}{2} \\
 \hline
 \text{Ans.} \quad \text{£.389 } 17 \quad 4\frac{1}{2}
 \end{array}$$

Second Method.

1732,75

,3

519|825

20

16|500

12

6|000

$$\begin{array}{r}
 \frac{1}{2}) 519 \quad 16 \quad 6 \text{ Massachusetts} \\
 129 \quad 19 \quad 1\frac{1}{2} \text{ Exchange} \\
 \hline
 \end{array}$$

Ans. £.389 17 4½ Sterling.

1. What is the Federal amount of an invoice of goods, charged at £.196 14 6 Sterling advancing on it 25 per cent?

$$\begin{array}{r}
 25 \quad \frac{1}{4}) 196 \quad 14 \quad 6 \text{ Sterling} \\
 49 \quad 3 \quad 7\frac{1}{2} \text{ Advance} \\
 \hline
 \end{array}$$

245 18 1½

Exchange at 33½ per cent. 81 19 4½

£.327 17 6 Massachusetts

3)327875

cts. 109291½ Ans. 1092 dols. 91½ cts.

2. The Sterling cost of certain goods being £.60 12 6, what does it amount to in Massachusetts money, advancing on it 50 per cent.?

60 12 6

50 per cent. advance 30 6 3

90 18 9

Exchange at 33½ per cent. 30 6 3

Ans. £.121 5 0 Massachusetts money.

The mercantile method, with 50 per cent. advance, is to double the Sterling for Massachusetts money; thus,

60 12 6 Sterling.

2

£.121 5 0 Massachusetts, as above.

3. An invoice of goods, charged at £.52 19 7 sterling, is sold at 75 per cent. advance on the sterling cost, how much is it in Massachusetts money ?

$$\begin{array}{r}
 \text{Advance at } 50 \quad 52 \ 19 \ 7 \\
 \quad 25 \quad 26 \ 9 \ 9\frac{1}{2} \\
 \quad \quad 13 \ 4 \ 10\frac{1}{2} \\
 \hline
 \quad \quad 92 \ 14 \ 3\frac{1}{2}
 \end{array}$$

Exchange at $33\frac{1}{3}$ per cent. 30 18 1

Ans. £.123 12 $4\frac{1}{2}$ Massachusetts money.

The mercantile method, with 75 per cent. advance, is to multiply the sterling by $2\frac{1}{3}$ for Massachusetts money.

$$\begin{array}{r}
 \text{Thus, } 52 \ 19 \ 7 \\
 \quad \quad 2\frac{1}{3} \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 105 \ 19 \ 2 \\
 17 \ 13 \ 2\frac{1}{2} \\
 \hline
 \end{array}$$

£.123 12 $4\frac{1}{2}$ Massachusetts money, as above.

4. The sterling cost of certain goods being £.214 11 6, how much is it in Federal money, advancing thereon 60 per cent ?

$$\begin{array}{r}
 \quad \quad 214 \ 11 \ 6 \\
 50 \ \frac{1}{2} \quad 107 \ 5 \ 9 \\
 10 \ \frac{1}{2} \quad 21 \ 9 \ 1\frac{1}{2} \quad \left. \vphantom{\begin{array}{l} 107 \\ 21 \end{array}} \right\} \text{advance} \\
 \hline
 \quad \quad 343 \ 6 \ 4\frac{1}{2} \\
 \text{Exchange } \frac{1}{3} \ 114 \ 8 \ 9\frac{1}{2} \\
 \hline
 \quad \quad 457 \ 15 \ 2\frac{1}{2} \text{ Massachusetts}
 \end{array}$$

$$\begin{array}{r}
 \text{Or thus, } 214 \ 11 \ 6 \text{ Sterling} \\
 \text{Exchange } \frac{1}{3} \ 71 \ 10 \ 6 \\
 \hline
 \end{array}$$

$$\begin{array}{r}
 \quad \quad 286 \ 2 \ 0 \\
 50 \ \frac{1}{2} \ 143 \ 1 \ 0 \\
 10 \ \frac{1}{2} \ 28 \ 12 \ 2\frac{1}{2} \\
 \hline
 \quad \quad 457 \ 15 \ 2\frac{1}{2} \text{ Massachusetts}
 \end{array}$$

$$\begin{array}{r}
 ,3)457,759 \\
 \hline
 \end{array}$$

Dollars 1525,86 $\frac{1}{2}$ Ans. 1525 dols.86 $\frac{1}{2}$ etc.

5. What is the amount of a bill of exchange of £.115 14 9 sterling, sold in Boston at $1\frac{1}{2}$ per cent. advance?

$\frac{1}{2}$) 115 14 9 Sterling
38 11 7 Exchange

154 6 4 Massachusetts money

,3) 154,317

514,39 Federal

$1\frac{1}{2}$

51439.

25719

Cents 771|58

	dols.	cts.
Value at par	514	39
Advance	7	$71\frac{1}{2}$
Amount.	522	$10\frac{1}{2}$

Or thus, Value at par $\frac{dols. cts.}{514 39}$

Adv. at 1 pr ct. 5 14 3
 $\frac{1}{2}$ do.. 2 57 1

7 71 4 Adv. at $1\frac{1}{2}$ pr ct.

Amount 522 10 4

6. A merchant in Boston receives a parcel of goods from London, charged in the invoice at the following prices, and marks them for sale at 60 per cent. advance on the sterling cost; required the selling price of each in Massachusetts money?

s.	d.	s.	d.	dols.	c.	m.
13	8 sterling, adv. 60 per ct.	29	$1\frac{1}{2}$	Massa. money, or	4	85 3
5	10	12	$5\frac{1}{2}$		2	7 3
3	4	7	$1\frac{1}{2}$		1	18 3
6	$1\frac{1}{2}$	13	$0\frac{1}{2}$		2	17 6
17	0	36	3		6	4
33	1	70	$6\frac{1}{2}$		11	75 6
1	2	2	$5\frac{1}{2}$			41
18	10	40	2		6	69 4
11	.....	23	$5\frac{1}{2}$		3	91
2	4	4	$11\frac{1}{2}$			82 3
32	3	68	$9\frac{1}{2}$		11	46 6
27	9	59	$2\frac{1}{2}$		9	86 3

7. A watch that cost 15 guineas in London, was sold in Boston at 50 per cent. advance on the sterling cost, what was the price?

15 guineas = £.15 15 0 Sterling

2.

31 10 0 Massachusetts.

,3)31,5.

Ans. 105 dollars.

8. How much is the premium of insuring £.294 at 8 guineas per cent. ?

Ans. £.24 13 11 Sterling.

.....

Mercantile methods of calculating, viz.

At 25 per cent. disc. from the sterling cost, multiply it by 1 for the answer in Massachusetts money.

10	.....	1½
par	.....	1½
12½ per cent. adv. on the sterling cost, multiply it by	.....	1½
25	.....	1½
31½	.....	1½
50	.....	2
62½	.....	2½
65	.....	2½
75	.....	2½
87½	.....	2½
100	.....	2½
125	.....	3
140	.....	3½
150	.....	3½
162½	.....	3½
175	.....	3½
200	.....	4

I R E L A N D.

The money of account as in England, but different in value. The par between England and Ireland is 8½ per cent. that is, £.100 sterling money is £.108 6 8 in Ireland.

Mercantile weights and measures, the same as in England.

The United States dollar is equal to 4s. 10½d. Irish.

The English guinea is equal to 22s. 9d. Irish.

To reduce Irish money to Federal.

RULE. Reduce the given sum to half pence, annex two cyphers to it, and then divide by 117, (the half pence in a dollar)

and the quotient is the answer in cents. Or reduce the Irish to Sterling, by deducting $\frac{1}{13}$ from it, and then work as for Sterling.

EXAMPLE.

Change £.278 15 9 Irish money to Federal.

First method.	Second method:
$\begin{array}{r} 278\ 15\ 9 \\ 20 \overline{) } \\ \hline 5575 \\ 12 \overline{) } \\ \hline 66909 \\ 2 \overline{) } \\ \hline 9)13381800 \\ 9 \times 13 = 117 \overline{) } \\ 13)1486866 \\ \hline 114374\ \text{cents.} \end{array}$	$\begin{array}{r} \frac{1}{13})278\ 15\ 9\ \text{Irish} \\ 21\ 8\ 11\ \text{Exchange} \\ \hline 257\ 6\ 10\ \text{Sterling} \\ 85\ 15\ 7\frac{1}{2} \\ \hline 343\ 2\ 5\frac{1}{2}\ \text{Mass.} \\ \hline ,3)343,122 \\ \hline 1143,74\ \text{cents.} \\ \hline \text{Ans. 1143 dols. 74 cts.} \end{array}$

.....

To change Federal money to Irish.

RULE. Multiply the given sum by 117, reject two figures from the product to the right hand, and the remaining figures are the half pence in the given sum.

1. Change 1143 dols. 74 cts. to Irish.

$$\begin{array}{r} 114374 \\ 117 \overline{) } \\ \hline 800618 \\ 114374 \\ \hline 114374 \\ \hline 2)133817|56 \\ \hline 12)66908\frac{1}{2} \\ \hline 2|0)557|5\ 8 \\ \hline \text{Ans. £.278 15 8}\frac{1}{2} \end{array}$$

If the sum is dollars only, work by either of the following methods.

2. Change 1537 dollars to Irish.

First method.				Second method.			
1537 at 4s. 10½d.				1537			
				,3			
4s. 10½d.	307	8					
8d. 10½d.	51	4	8	461	2	Massachusetts	
2 10½d.	12	16	2	115	5	6	Exchange at 25 per ct.
10½d.	3	4	0½				
				345	16	6	Sterling
Ans. £374	12	10½	1½	28	16	4½	Ex. 8½ pr. ct. or 1d. on 1s.
				£374 12 10½			

In changing Sterling to Irish money at par, $\frac{1}{2}$ is added to the sum for Irish; and in changing Irish to Sterling, $\frac{1}{3}$ is deducted for Sterling because 12 pence English are equal to 13 pence Irish, making the Exchange 1d. in a shilling, 1s. 8d. in a pound, and £.8 6 8 per cent.

EXAMPLES.

1. Change £.394 17 6 Sterling to Irish, at par, or £.8½ per cent.

$$\begin{array}{r} \frac{1}{12}) 394 \ 17 \ 6 \\ \underline{32 \ 18 \ 1\frac{1}{2}} \\ \text{Ans. } £.427 \ 15 \ 7\frac{1}{2} \text{ Irish.} \end{array}$$

2. Change £.427 15 7½ Irish money to Sterling, at 8½ per cent. in favour of England.

$$\begin{array}{r} \frac{1}{13}) 427 \ 15 \ 7\frac{1}{2} \\ \underline{32 \ 18 \ 1\frac{1}{2}} \\ \text{Ans. } £.394 \ 17 \ 6 \text{ Sterling.} \end{array}$$

3. Change £.370 Sterling to Irish, at 9 per cent.

$$\begin{array}{ccc} £. & £. & £. \\ 100 & : & 109 :: 370 \end{array} \quad \text{Ans. } £.403 \ 6 \ 0$$

4. Reduce £.403 6 Irish money to Sterling, at 9 per cent.

$$\begin{array}{ccc} £. & £. & £. \\ 100 & : & 109 :: 403 \ 6 \end{array} \quad \text{Ans. } £.370$$

H A M B U R G H.

Accounts are kept in Hamburg in Marks, Shillings Lubs or Stivers, and Deniers.

12 deniers, or 2 grotes, make 1 shilling lubs, or stiver.
 16 shillings lubs, stivers, or }
 32 grotes } 1 mark.

A L S O,

12 grotes or pence Flemish make 1 shilling Flemish.
 20 shillings Flemish 1 pound.

NOTE. 3 marks make 1 rix dollar.
 7½ do. 1 pound Flemish.
 A shippound in Hamburg 280 lb.
 A ring of staves . . do 240
 100 lb. in Hamburg 107½ lb. in U. States.
 100 ells. . . do. 62½ yards.

The currency of Hamburg is inferior to the bank money; the *agio*, or rate, is variable; May 14th, 1798, it was 20 per cent. in favour of the bank.

The mark banco is 33½ cents; (See laws of the U. States.)

EXAMPLES.

1. Change 12843 marks to Federal, at 33½ cts. per mark.
 $33\frac{1}{2} = \frac{1}{3} \overline{)12843}$

Ans. 4281 dollars.

2. In 4967 marks 8 stivers banco, how many dollars, exchange as above?

$$\begin{array}{r} 33\frac{1}{2} = \frac{1}{3} \overline{)4967.} \\ \underline{1655,66\frac{1}{2}} \\ 8 \text{ stivers} \quad , 16\frac{1}{2} \\ \underline{\hspace{1.5cm}} \\ \text{Dols. } 1655,83 \end{array}$$

Ans. 1655 dols. 83 cts.

.....

To change Hamburg money to Sterling.

RULE. As the given rate is to one pound, so is the Hamburg sum to the Sterling required.

EXAMPLES.

1. Change 2443 marks $9\frac{1}{2}$ stivers to Sterling, exchange at 32s. 6d. Flemish per pound Sterling.

s.	d.	£.	m.	st.
32	6	1	2443	$9\frac{1}{2}$
12	grotes.		32	2
<hr/>			<hr/>	
390			4886	19 grotes.
			7329	
			19	
			<hr/>	
			78195	
			1	
			<hr/>	
			390)78195	(200£.
			780	
			<hr/>	
			195	
			20	
			<hr/>	
			390)3900	(10s.
			3900	
			<hr/>	

Ans. £.200 10 0

2. In 12093 marks 12 stivers, how many pounds sterling, exchange at 32s. 3d. Flemish per pound Sterling?

Ans. £.1000

3. In 4178 marks 2 stivers, how many pounds Sterling, exchange at 31s. 10d. Flemish per pound Sterling?

Ans. £.350

4. Change 1971 marks 13 stivers to Sterling, exchange at 35s. 6d. Flemish per pound Sterling.

Ans. £.148 2 4

.....

To change Sterling to Hamburg money.

RULE. As 1 pound Sterling is to the given rate, so is the Sterling sum to the Hamburg required.

EXAMPLE.

Change £.350 Sterling to Hamburgh money, exchange at 31s. 10d. Flemish per pound Sterling.

$$\begin{array}{rclcl} \text{£.} & & \text{s.} & \text{d.} & \text{£.} \\ 1 & : & 31 & 10 & :: & 350 \\ & & 12 & & & \end{array}$$

$$\begin{array}{r} 382 \text{ grotes} \\ 350 \end{array}$$

$$\begin{array}{r} 19100 \\ 1146 \end{array}$$

$$2)133700 \text{ grotes}$$

$$16)66850 \text{ stivers}$$

$$4178 \text{ 2}$$

$$\text{Ans. 4178 marks 2 stivers.}$$

Proving the answers in the preceding case will further exemplify this.

.....

To reduce Current to Bank money.

RULE. As 100 marks with the agio added, is to 100 bank, so is the current money to the bank required.

EXAMPLES.

1. Change 560 marks 8 stivers current to banco, agio at 18 per cent.

$$\begin{array}{r} 18 \\ 100 \end{array}$$

$$118 : 100 :: 560 \text{ 8. Ans. 473 marks.}$$

2. Change 2366 marks current to banco, agio at 20 per cent.
Ans. 1971 marks, 10 $\frac{2}{3}$ stivers.

3. Change 7456 current marks to banco, agio at 22 per cent.
Ans. 6111 marks, 7 stivers.

To change Bank to current money.

RULE. As 100 marks is to 100 with the agio added, so is the bank given to the current required.

EXAMPLES.

1. Change 475 marks banco to current, agio at 18 per ct.

$\begin{array}{r} 18 \\ 100 \\ \hline m. \quad \quad m. \\ 100 : 118 :: 475 \end{array}$	<p>Ans. 560 marks, 8 stivers.</p>		
<p><i>Or thus,</i></p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;"> $\begin{array}{r} 475 \\ 18 \\ \hline 3800 \\ 475 \\ \hline 85150 \\ 16 \\ \hline 8100 \end{array}$ </td> <td style="width: 50%; text-align: center; vertical-align: top;"> $\begin{array}{r} 475 \text{ bank} \\ 85 \text{ 8 agio} \\ \hline 560 \text{ 8 as above.} \\ \hline \end{array}$ </td> </tr> </table>		$\begin{array}{r} 475 \\ 18 \\ \hline 3800 \\ 475 \\ \hline 85150 \\ 16 \\ \hline 8100 \end{array}$	$\begin{array}{r} 475 \text{ bank} \\ 85 \text{ 8 agio} \\ \hline 560 \text{ 8 as above.} \\ \hline \end{array}$
$\begin{array}{r} 475 \\ 18 \\ \hline 3800 \\ 475 \\ \hline 85150 \\ 16 \\ \hline 8100 \end{array}$	$\begin{array}{r} 475 \text{ bank} \\ 85 \text{ 8 agio} \\ \hline 560 \text{ 8 as above.} \\ \hline \end{array}$		

2. Change 1971 marks, $10\frac{2}{3}$ stivers banco to current, agio at 20 per cent.

$\begin{array}{r} m. \quad s. \\ 20 \frac{1}{3}) 1971 \text{ 10}\frac{2}{3} \text{ banco} \\ 394 \quad 5\frac{1}{3} \text{ agio} \\ \hline \end{array}$	<p>Ans. 2366 0 current.</p>
---	-----------------------------

.....

PRACTICAL QUESTIONS.

1. How much will 63452 lb. of cotton come to, at 8 grotes per lb.?

$\begin{array}{r} lb. \quad gr. \quad lb. \\ 1 : 8 :: 63452 \\ 8 \\ \hline 2) 507616 \text{ grotes} \\ \hline 16) 253808 \text{ stivers} \\ \hline \end{array}$	<p>Ans. 15863 marks.</p>
---	--------------------------

2. What will 351 lb. of cotton come to at 50*d.* per lb. ?

NOTE. *d.* is the mark for pence Flemish, equal in value to half stivers or half shillings lubs.

$$\begin{array}{rcl} \text{lb.} & \text{d.} & \text{lb.} \\ 1 & : 50 & :: 351 \\ & & 50 \end{array}$$

2)17550 grotes or pence flemish.

16)8775 stivers.

548 7 Ans. 548 marks 7 stivers.

3. What will 339 bars Russian iron come to, wt. 19662 lb. at 35½ marks per shippound ?

$$\begin{array}{rcl} \text{lb.} & \text{m.} & \text{lb.} \\ 280 & : 35\frac{1}{2} & :: 19662 \end{array} \quad \text{Ans. 2492 m. 14 stiv.}$$

			m.	st.
4.	280 lb. of cotton.....at	21 grotes per lb.	183	12
5.	4002½ lb. coffee	8¼ stivers	2063	10
6.	2438 pipe staves.....	16 marks per ring of 240 ..	162	9
7.	3540 hhd. ditto	8½ ditto ditto.....	125	6
8.	529 barrel ditto.....	5¼ ditto ditto.....	11	9
9.	1790 lb. sugar.....	21¼ pence per lb.	1188	10
10.	4892 lb. rice	18¼ marks per 100	892	12
11.	4 pieces 10-4 bedtick ...	24 ditto	96	0
12.	140 half pint tumblers.....	8 ditto per 100	11	3
13.	100 boxes window glass ...	23 ditto per box	2300	
14.	1526½ lb. coffee	16½ stivers per lb.	1574	3
15.	245 bars iron, wt. 8434 lb. ..	41 marks per shippound....	1235	
16.	10 bales hemp, wt. 14108 lb.	74 ditto ditto	3728	

17. What is the commission on 18270 marks, at 2½ per cent. ?

Ans. 456 m. 12 st.

18. What is the interest of 6370 marks, for 3 months, at 5 per cent. per annum ?

Ans. 79 m. 10 st.

19. Change 5955 marks $7\frac{1}{2}$ stivers to Dutch florins, at $38\frac{1}{2}$ grotes per florin.

	<i>mar.</i>	<i>st.</i>	
	5955	$7\frac{1}{2}$	
grotes in a mark =	32	2	grotes a stiver.
	<hr/>		
	11910	15	grotes in $7\frac{1}{2}$ stivers.
	17865		
	15		
	<hr/>		
grotes $38\frac{1}{2}$	190575		grotes.
2	2		
	<hr/>		
77)	381150	(4950 guilders.	
	308		
	<hr/>		
	731		
	693		
	<hr/>		
	385		
	385		
	<hr/>		

Ans. 4950 gild. or flor.

20. An American merchant orders his correspondent in Amsterdam to remit 4980 florins $16\frac{1}{2}$ stivers to Hamburg; this being done, when the exchange is $39\frac{1}{4}$ stivers for 2 marks, what sum is he credited for in Hamburg?

<i>st.</i>	<i>M.</i>	<i>F.</i>	<i>st.</i>
$39\frac{1}{4}$	:	2	::
4		4980	$16\frac{1}{2}$
		20	
		<hr/>	
157		99616 $\frac{1}{2}$	
		2	
		<hr/>	
		199233	
		4	
		<hr/>	
		157)796932	(5076 marks.
		785	
		<hr/>	
		1193	
		1099	
		<hr/>	
		942	
		942	
		<hr/>	

Ans. 5076 marks.

H O L L A N D.

Accounts are kept in Florins or Guilders, Stivers, Deniers or Pennings.

8 penningsmake..... 1 grote.
 2 grotes, or 16 pennings 1 stiver.
 20 stivers, or 40 grotes 1 gilder or florin.

ALSO,

12 grotes, or 6 stivers 1 shilling.
 20 shillings, or 6 guilders 1 pound Flemish.
 2½ florins 1 rix dollar.

The florin or gilder of the United Netherlands is estimated in the United States at 40 cents, or 2 cents per stiver.

100 lb. in Amsterdam make 109½ lb. in the U. States.

100 ellsdo..... 75 yards do.

In liquid measure, 16 mingles make 1 steckan, 8 steckans 1 aum.

.....

1. Change 1954 florins to Federal money, at 40 cts. per florin.

$$\begin{array}{r} 1954 \\ \times 40 \\ \hline \end{array}$$

dols. 781,60 Ans. 781 dols. 60 cts.

2. Change 2653 guilders 17 stivers to Federal money, at 40 cents per gilder.

$\begin{array}{r} 2653 \quad 17 \\ 40 \quad 2 \\ \hline 106120 \quad 34 \\ 34 \\ \hline 106154 \text{ cts.} \end{array}$	<p>Or thus, 2653 17</p> $\begin{array}{r} 2653 \quad 17 \\ 20 \\ \hline 53077 \text{ stivers.} \\ 2 \text{ cts. per stiver.} \\ \hline 1061,54 \\ \text{Ans. 1061 dols. 54 cts.} \end{array}$
--	---

3. Change 1061 dols. 54 cts. to guilders, at 40 cts. per gilder.

$$\begin{array}{r} 2)106154 \text{ cents.} \\ \hline 2|0)5307|7 \text{ stivers.} \\ \hline 2653 \quad 17 \end{array}$$

Ans. 2653 gild. 17 stiv.

3. What must be paid in Boston for an invoice of goods charged at 591 florins 17 stivers ; allowing the exchange at 40 cents. per florin, or 2 cts. per stiver, and advancing on it 60 per cent. ?

591 17		
20		
<hr/>		
11837 stivers.	Am. of invoice,	d. c. 236 74
2	Advance,	142 04
<hr/>		
dols. 236,74	Ans.	378 78.
60 per cent.		
<hr/>		
142,0440		

.....

To change Sterling to Flemish.

RULE. As 1 pound sterling is to the given rate, so is the sterling given to the Flemish required.

EXAMPLES.

1. In £.100 10s. sterling, how many guilders, exchange at 33s. 9d. Flemish per pound sterling ?

£.	s. d.	£.	s.
1	: 33 9	::	100 10.
20	12		20
<hr/>			
20	405 grts.	2010	

405.

10050

80400

20)81405,0

2)40702½ grotes.

2)20351½ stivers.

1017 11½

Ans. 1017 gild. 11½ st.

.....

To change Flemish to Sterling.

RULE. As the given rate is to £.1 sterling, so is the Flemish given to the sterling required.

EXAMPLE.

Change 1017 gilders $11\frac{1}{2}$ stivers to sterling, exchange at 33s. 9d. Flemish per £. sterling.

s. d.	£.	fl.	st.
33 9	: 1	:: 1017	$11\frac{1}{2}$
12		40	2
<hr/>		<hr/>	
405	grotes..	40680	$22\frac{1}{2}$
		22 $\frac{1}{2}$	
		<hr/>	

405)40702 $\frac{1}{2}$ (100
405

202 $\frac{1}{2}$
20

405)4050(10
4050

Ans. £.100 10

To change Current Money to Bank.

RULE. As 100 gilders with the agio added, is to 100 bank, so is the current money given to the bank required.

EXAMPLE.

Change 823 gilders $9\frac{1}{2}$ stivers current money into bank, agio at $4\frac{1}{2}$ per cent.

g.	:	g.	::	g.	s.
104 $\frac{1}{2}$	:	100	::	823	$9\frac{1}{2}$
20				20	
<hr/>				<hr/>	
2090				16469 $\frac{1}{2}$	
				100	
				<hr/>	

2090)1646920(788 gilders.

To change Bank Money into Current.

RULE. As 100 gilders bank is to 100 with the agio-added, so is the bank money given to the current required..

EXAMPLE.

Change 788 gilders bank money to current, agio at $4\frac{1}{2}$ per cent.

g. g. g.
100 : 104 $\frac{1}{2}$:: 788 Ans. 823 gilders, $9\frac{1}{2}$ stiv.

Q. 2

PRACTICAL QUESTIONS.

1. What will 1867 lb. of coffee come to at 19 stivers per lb.?

$$\begin{array}{r}
 1867 \\
 19 \\
 \hline
 16803. \\
 1867 \\
 \hline
 2)0)3547\overline{)3} \text{ stivers.} \\
 \hline
 1773 \text{ 13}
 \end{array}$$

Ans. 1773 guilders, 13 stivers.

2. What will 92 hhds. of sugar come to, weighing 104242 lb. gross, deducting 2 per cent. for good weight, tare 18 per cent. at 21 grotes per lb.?

$$\begin{array}{r}
 104242 \\
 \text{deduct 2 per cent.} \quad 2085. \\
 \hline
 102157 \\
 \text{tare 18 per cent.} \quad 18388 \\
 \hline
 83769 \text{ nt. wt.} \\
 21 \\
 \hline
 83769 \\
 167538 \\
 \hline
 2)1759149 \text{ grotes.} \\
 \hline
 2)0)87957\overline{)4\frac{1}{2}} \text{ stivers.} \\
 \hline
 43978 \text{ 14}\frac{1}{2}
 \end{array}$$

Ans. 43978 guilders, 14½ stivers.

3. What will 251 bars of iron come to, weighing gross 10364 lb. at 9½ guilders per 100 lb. deducting 2 per cent.?

$$\begin{array}{r}
 10364 \\
 9\frac{1}{2} \\
 \hline
 98276 \\
 5182 \\
 2591 \\
 \hline
 1010,49 \\
 20 \\
 \hline
 9,80 \\
 16 \\
 \hline
 12,80
 \end{array}$$

$$\begin{array}{r}
 \text{g.} \quad \text{s.} \quad \text{p.} \\
 2 \text{ pr. ct.} = \frac{1}{50}) 1010 \quad 9 \quad 12 \\
 \hline
 20 \quad 4 \quad 3. \\
 \hline
 \text{Ans.} \quad 990 \quad 5 \quad 9
 \end{array}$$

4. What will 143 steckans 2 mingles of brandy come to, at 42 guilders per aum?

	8)143		
	<u>17</u>	7	2
	42		
	<u>34</u>		
	68		
4 steckans	$\frac{1}{2}$	21	
2	$\frac{1}{2}$	10	10
1	$\frac{1}{2}$	5	5
2 mingles	$\frac{1}{2}$	0	13
		<u>751</u>	8 2

			<i>gild.</i>	<i>sts</i>
5.	21315 lb. of sugar	23	grotes per lb. 12256	2
6.	56560	25	..... 35850	
7.	27093	25	..... 17271	15
8.	8189 lb. coffee	23	stivers 9622	1
9.	4650	23	..... 5405	12
10.	1970	19	..... 1945	7
11.	39285	21	..... 41740	6
12.	212 ells linen, 208 payable	30	..... 312	
13.	4190 lb. butter	13	gild. per 40 lb. 1361	15
14.	6476	11	..... 1861	17
15.	2012 lb. lead	13	do. per 100 lb. .. 271	12
16.	214 steck, 11 ming. brandy	42	do. per aum. 1127	2

D E N M A R K.

Accounts are kept in Danish current dollars and skillings, reckoning 96 skillings to the dollar.

The course of exchange on London in September, 1799, was 5 rix or Danish dollars for 1 pound sterling.

The rix dollar of Denmark is estimated at 100 cents.—(*See Laws of the United States.*)

96 pounds of Denmark make 100 pounds in the U. States.

Their weights are shippounds, lisppounds and pounds—

16 pounds make 1 lispound.

20 lispounds, or 320 pounds 1 shippound.

1. How much will 8 pieces of platillas come to, at 9 dols. 56 skills. per piece?

$$\begin{array}{r} 9 \ 56 \\ 8 \\ \hline 76 \ 64 \end{array}$$

Ans. 76 dols. 64 skills.

2. How much will 1418 bars of iron come to, weighing 263 shippounds 9 lispounds and 4 pounds, at 15 dols. per shippound?

lb. d. s. lis. lb.
320 : 15 :: 263 9 4

20

5269
16

31618
5269

84308
15

32|0)126462|0(3951

96

304
288

166
160

62
32

30
96

32)2880(90
2880

Or, ship.
263
15

lis. 3945
5 $\frac{1}{4}$ 3 72
4 $\frac{1}{2}$ 3 00
4 lb. $\frac{1}{16}$ 0 18

Ans. 3951 90

Ans. 3951 dols. 90 sk.

3. What is the commission on 21545 Danish dols. 13 skills., at 2 per cent?

21545. 13
2

430,90 26
96

566
810

86,66

Ans. 430 dols. 86 skills.

4. What will 4 hhds. of sugar come to, weighing gross 4314 lb. tare 17 per cent. at 22 skillings per lb. ?

Ans. 820 dols. 62 skills.

		dls. sks.	dls. sks.
5.	4 pieces table cloth	3 80	15 32
6.	50	9 56	479 16
7.	13	17 64	229 64
8.	24	12	288 00
9.	50	15	750 00
10.	100 coils cord, wt. 62 sh. 16 l 2 lb. 30 per shippound		1884 18
11.	85 bun. cl hemp, 250	56	9000 00
12.	1951 bars Rus. iron, 362 8 10 14		5074 3

13. How many Danish dollars will be received in Copenhagen, for a bill of £.2300 on London, exchange at 5 rix dollars per pound sterling ?

Ans. 11500 dols.

14. A bill is drawn in Copenhagen for 18574 marks, 7 stivers, Hamburg money, when the exchange is 128 Danish dollars for 100 rix dollars in Hamburg, how many Danish dollars does it amount to ?

NOTE. Three marks are equal to 1 rix dollar.

m. r.d. m. st. r.d. sk.
If 3 : 1 :: 18574 7 : 6191 46

r.d. D.d. r.d. sk.
If 100 : 128 :: 6191 46 Ans. 7925 Dan. dols. 6 sk.

Or thus, 3)18574 7 Hamburg money.

6191 46

28 per cent. 1733 56

7925 6 Dan. money, as above.

.....

B R E M E N.

Accounts are kept in rix dollars and grotes, reckoning 72 grotes to the rix dollar, which is equal to 2½ marks.

On the 29th Nov. 1795, the exchange on London was 551 rix dollars for £.100 sterling.

In 1802, the course of exchange on the United States was 75 cents per rix dollar.

The Bremen last is equal to 80 bushels in the U. States.

100 lb. in Bremen are equal to 110 lb. in the U. States.

1. What will 1104 lb. of coffee come to at $32\frac{3}{4}$ grotes per lb. ?

$$\begin{array}{r}
 1104 \\
 32\frac{3}{4} \\
 \hline
 2208 \\
 3312 \\
 552 \\
 276 \\
 \hline
 72)36156(502 \text{ 12} \\
 360 \\
 \hline
 156 \\
 144 \\
 \hline
 \end{array}$$

12 Ans. 502 rix dols. 12 grotes.

2. What is the commission on 7621 rix dols. 6 gr. at $3\frac{1}{2}$ per cent. ?

Ans. 266 rix dols. 53 grotes.

			r. dols. gr.
3.	3071 lb. coffee ..	$32\frac{3}{4}$ grotes per lb. ..	1396 63
4.	400	$32\frac{3}{4}$	181 18
5.	706	$33\frac{1}{4}$	328 35
6.	31407 lb. sugar ..	$15\frac{1}{4}$	6870 20

.....

A N T W E R P.

Accounts are kept in Antwerp in gilders, shillings, and grotes.

12 grotes make 1 shilling.

$3\frac{1}{2}$ shillings, or 40 grotes 1 gilder.

The Brabant or Antwerp grotes are of the value of the cents of the United States, a gilder being reckoned at 40 cents. In the current money of Antwerp they have stivers of the value of the stiver of Amsterdam, or 2 cents United States currency.

100 pots Brabant = $36\frac{1}{2}$ gallons U. States.

96 lb. Antwerp = 100 lb. do.

100 Brabant ells, about 74 yds. American.

The new quintal of Antwerp consists of 10 myriagrammes or 204 lb. 14 oz. Avoirdupois weight.

The loss on sugar exported from America to Antwerp is $22\frac{1}{2}$ per cent. viz. tare 14 lb. per 100 lb.—good weight 2 lb.—loss of weight 5 lb.—discount $1\frac{1}{2}$ lb. equal to $22\frac{1}{2}$ lb. per 100 lb.

Loss on cotton $12\frac{1}{2}$ per cent.—on coffee in bags $11\frac{1}{2}$ per cent.

EXAMPLES.

1. A cargo consisting of 48 hhds. sugar, weighing 376 cwt. 1 qr. 14 lb. valued per invoice at 12 dols. per cwt. and 63 bags coffee weighing 7345 lb. at 32 cents per lb. is sold in Antwerp ; what sum was received for it, in gilders and grotes, at 40 cents per gilder, allowing the customary deductions for tare, &c. at an advance of $33\frac{1}{3}$ per cent. from the invoice ?

	cwt. qr. lb.		lb.
	376 1 14		7345
Tare, &c. $22\frac{1}{2}$ per ct.	84 2 $20\frac{1}{2}$	Tare, &c. $11\frac{1}{2}$ per ct.	844 $\frac{1}{2}$
Neat	<u>291 2 $22\frac{1}{2}$</u>	Neat	<u>6500 $\frac{1}{2}$</u>
			32
	dols. cts.		13000
	12 00		19500
	10		16
	<u>120 00</u>		
	10	dols.	<u>2080,16</u>
	<u>1200 00</u>		
	2		
	<u>2400 00</u>		
	1080 00	val. of 200 cwt.	
	12 00	..... 90	
	6 00	..... 1	
	1 50	..... 2 qrs.	
	75	..... 14 lb.	
	10 7	..... 7	
	5 3	..... 1	
		..... $\frac{1}{2}$	
Value of sugar	3500 41 0	291 2 $22\frac{1}{2}$	
do. coffee	2080 16 0		
	<u>5580 57 0</u>		
Adv. $33\frac{1}{3} = \frac{1}{3}$	1860 19 0		
	<u>7440 76 0</u>		
Dols.			
		40)744076 cents.	
		<u>18601 36</u>	
		Ans. 18601 gild. 36 gr.	

2. What sum must be paid in Boston for an invoice of goods imported from Antwerp, amounting to 7315 gilders, exchange 40 cents per gilder, at an advance of 40 per cent ?

7315	7315
40 per cent. adv.	2926 adv.
<hr/>	<hr/>
2926,00	10241
<hr/>	40 cents per gild.
	<hr/>
	4096,40
	<hr/>
	Ans. 4096 dols. 40 cts.

.....

R U S S I A.

Accounts are kept in Petersburg, in Rubles and Copecs, reckoning 100 copecs to 1 ruble.

The course of exchange on London, in July, 1796, was $34\frac{3}{4}$ d. sterling per ruble.

Ditto on Amsterdam 30 stivers banco per ruble.

Ditto on Hamburgh, Aug. 1798, $22\frac{1}{2}$ st. banco do.

Ditto on U. States, Sept. 1802, 55 cents do.

100 lb. Petersburg weight are equal to $88\frac{3}{4}$ lb. in the U. States.

Their weights are Barquits, Poods, Pounds, and Zollotnicks—

96 zollotnicks make 1 pound.

40 pounds 1 pood.

10 poods 1 barquit.

Their long measure is the Arsheen, of 28 American inches : 9 arsheens are equal to 7 yards.

1. What will 7500 arsheens of ravens-duck come to, at $14\frac{1}{2}$ rubles for 50 arsheens ?

arsh.	rub.	arsh.	
50	: $14\frac{1}{2}$	:: 7500	Ans. 2175 rubles.

2. What will 813 poods 5 lb. of clean hemp come to, at 30½ rubles per barquit ?

lb. rub. p. lb.
400 : 30½ :: 813 5

40
32525
30½
975750
16262
400)9920|12
2480,03

Ans. 2480 rubles 3 copecs.

3. What will 2846 poods 5 lb. of bar iron come to, at 200 copecs per pood ?

2846
200
569200
5 lb. ½ 25
copecs 569225

Ans. 5692 rubles 25 copecs.

4. What is the commission on 5256 rub. 33 cop. at 3 per ct. ?

5256,33
3
157,68,99

Ans. 157 rubles 68 copecs.

			rub. cop.
5.	4997½ arsheens flems	24 rubles per 50 arsheens.	2398 80
6.	1700 do. drillings	34 copecs per arsheen.	578
7.	355 do. ticking	100 do. do.	355
8.	118¼ do. do.	110 do. do.	130 62
9.	200 pieces of sail cloth	21 rubles per piece.	4200
10.	2101 poods 25 lb. hemp	31 do. per barquit.	6515 04

11. How many rubles must be received in Petersburg for a bill of 15500 guilders on Amsterdam, when the exchange is 30 stivers per ruble ?

st. cop. gild.
As 30 : 100 :: 15500

Or thus, ½)15500
5166,66⅔

310000 stivers.
100
30)3100000|0
10333,33⅓

10333,33⅓

Ans. 10333 rub. 33⅓ cop.

12. A bill of £.3000 Sterling is drawn on London, exchange at $31\frac{3}{4}d.$ Sterling per Ruble, what is its value in Petersburg?

$$\begin{array}{rcl} & d. & rub. & £. \\ \text{As } 31\frac{3}{4} & : & 1 & :: 3000 \\ & 4 & & 20 \end{array}$$

$$\begin{array}{r} 127 \\ \hline \end{array}$$

$$\begin{array}{r} 60000 \\ \hline \end{array}$$

$$\begin{array}{r} 12 \\ \hline \end{array}$$

$$\begin{array}{r} 720000 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \hline \end{array}$$

$$127)2880000(22677 \text{ rubles}$$

$$\begin{array}{r} 254 \\ \hline \end{array}$$

$$\begin{array}{r} 340 \\ \hline \end{array}$$

$$\begin{array}{r} 254 \\ \hline \end{array}$$

$$\begin{array}{r} 860 \\ \hline \end{array}$$

$$\begin{array}{r} 762 \\ \hline \end{array}$$

$$\begin{array}{r} 980 \\ \hline \end{array}$$

$$\begin{array}{r} 889 \\ \hline \end{array}$$

$$\begin{array}{r} 910 \\ \hline \end{array}$$

$$\begin{array}{r} 889 \\ \hline \end{array}$$

$$127)2100(16 \text{ copecs}$$

$$\begin{array}{r} 127 \\ \hline \end{array}$$

$$\begin{array}{r} 830 \\ \hline \end{array}$$

$$\begin{array}{r} 762 \\ \hline \end{array}$$

Ans. 22677 rub. 16 cop.

$$\begin{array}{r} 68 \\ \hline \end{array}$$

Two cyphers are annexed to the remainder instead of multiplying by 100 copecs.

.....

FRANCE.

12 deniers = 1 sol, 20 sols = 1 livre.

The crown of exchange is 3 livres tournois.

A livre tournois of France is estimated at $18\frac{1}{2}$ cents in the United States.

NOTE. The word *tournois* is applied to the money of France, as sterling is to the money of England.

EXCHANGE.

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I. Change £.1220 sterling to French money, exchange at 17½d. per crown of 3 livres tournois.

d.	liv.	£.
17½	: 3	:: 1220
8		20
<hr/>		
141		24400
		12
<hr/>		
		292800
		8
<hr/>		
		2342400
		3
<hr/>		
141	7027200	(49838 livres
	564	
<hr/>		
	1387	
	1269	
<hr/>		
	1182	
	1128	
<hr/>		
	540	
	423	
<hr/>		
	1170	
	1128	
<hr/>		
	42	
	20	
<hr/>		
141	840	(5s.
	705	
<hr/>		
	135	
	12	
<hr/>		
141	1620	(11d.
	141	
<hr/>		
	210	
	141	
<hr/>		
	69	

Ans. 49838 liv. 5 sol. 11 d

2. Change £.400 sterling to French money, exchange at $17\frac{3}{4}d.$ sterling per crown of 3 livres. Ans. 16225 liv. 7s. $0\frac{3}{4}d.$

3. Change 4224 livres tournois to sterling, exchange at $17\frac{3}{4}d.$ per crown of 3 livres.

$$\begin{array}{r}
 \text{liv.} \qquad \qquad \text{d.} \qquad \qquad \text{liv.} \\
 3 \quad : \quad 17\frac{3}{4} \quad :: \quad 4224 \\
 \hline
 \qquad \qquad \qquad 17\frac{3}{4} \\
 \hline
 \qquad \qquad \qquad 29568 \\
 \qquad \qquad \qquad 4224 \\
 \qquad \qquad \qquad 2112 \\
 \hline
 \qquad \qquad \qquad 3)73920 \\
 \hline
 \qquad \qquad \qquad 12)24640 \\
 \hline
 \qquad \qquad \qquad 2)0)205|3 \ 4 \\
 \hline
 \qquad \qquad \qquad 102 \ 13 \ 4
 \end{array}$$

Ans. £.102 13s. 4d.

Or, Take $\frac{1}{3}$ of the given sum to reduce it to crowns, and multiply by the rate of exchange; the product will be the answer in pence.

$$\begin{array}{r}
 \frac{1}{3})4224 \text{ livres} \\
 \hline
 \qquad \qquad \qquad 1408 \text{ crowns} \\
 \qquad \qquad \qquad 17\frac{3}{4} \\
 \hline
 \qquad \qquad \qquad 9856 \\
 \qquad \qquad \qquad 1408 \\
 \qquad \qquad \qquad 704 \\
 \hline
 \qquad \qquad \qquad 12)24640 \text{ pence} \\
 \hline
 \qquad \qquad \qquad 2)0)205|3 \ 4 \\
 \hline
 \qquad \qquad \qquad \text{£.102 13 4 as above.}
 \end{array}$$

4. Change 49838 livres 5s. $11\frac{3}{4}d.$ to sterling, exchange at $17\frac{3}{4}d.$ sterling per crown. Ans. £.1220.

5. What will 2434 velts of brandy come to, at 320 livres per 29 velts? Ans. 26857 liv. 18s. 7d.

6. What is the freight of 3302½ velt, at 9 livres per ton of 120 velt? Ans. 247 liv. 13s. 9d.

7. What is the commission on 36591 liv. 2s. 4 den. at 2½ per cent.? Ans. 914 liv. 15s. 6 den.

8. What is the interest of 66476 liv. 10s. 9 den. for 1 month and 10 days, at ½ per cent. per month?

$$\frac{1}{2})66476 \ 10 \ 9$$

$$\underline{332} | 38 \ 5 \ 4$$

$$20$$

$$\underline{7} | 65$$

$$12$$

$$\underline{7} | 84$$

$$10 \text{ days } \frac{1}{3} \quad \begin{array}{r} 332 \ 7 \ 7 \\ \underline{110 \ 15 \ 10} \end{array}$$

$$\text{Ans. Liv. } 443 \ 3 \ 5$$

9. What is the interest of 3255 livres, for 28 days, at ½ per cent. per month?

$$\frac{1}{2})3255$$

$$\underline{16} | 27 \ 10$$

$$20$$

$$\underline{5} | 50$$

$$12$$

$$\underline{6} | 00$$

$$16 \ 5 \ 6 \text{ for one month}$$

$$15 \text{ days } \frac{1}{2} \quad \begin{array}{r} 8 \ 2 \ 9 \\ \underline{5 \ 8 \ 6} \end{array}$$

$$10 \dots \frac{1}{3} \quad \begin{array}{r} 5 \ 8 \ 6 \\ \underline{1 \ 12 \ 6} \end{array}$$

$$3 \dots \frac{1}{3} \quad \begin{array}{r} 1 \ 12 \ 6 \end{array}$$

$$\text{Ans. Liv. } 15 \ 3 \ 9$$

The present money of account in France is in francs and centimes or hundredths.

In Nov. 1800, an English guinea was worth 25 fr. 75 cent.

A Spanish dollar 5 do. 53 do.

To change francs to livres tournois.

RULE. Multiply the francs by 81 and divide by 80 for livres.

EXAMPLE.

Change 3756 francs to livres.

$$\begin{array}{r}
 3756 \\
 \times 81 \\
 \hline
 3756 \\
 30048 \\
 \hline
 3,0)30423,6 \\
 \underline{3802\ 76} \\
 20 \\
 \hline
 8,0)152,0 \\
 \hline
 19
 \end{array}$$

Ans. 3802 liv. 19 sols.

To change livres tournois to francs.

RULE. Multiply the livres by 80, and divide the product by 81 for francs.

EXAMPLE.

Change 5469 livres to francs.

$$\begin{array}{r}
 5469 \\
 \times 80 \\
 \hline
 81)437520(5401,43 \\
 \underline{405} \\
 325 \\
 \underline{324} \\
 120 \\
 \underline{81} \\
 390 \\
 \underline{324} \\
 260 \\
 \underline{243} \\
 17
 \end{array}$$

Ans. 5401 fr. 43 cen.

To change sols and deniers to centimes.

RULE. Take one half of the sols and deniers, as if they were integers; this half is the number of centimes required.

EXAMPLES.

	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>	
Change	4	6	12	2	6	8	16	6	to centimes.
Ans.	23		61		34		83 centimes.		

When there is a remainder in dividing the sols, it is to be carried to the deniers, and reckoned 10 and not 12; add this 10 to the deniers, and take one half of the sum for the remaining centime.

EXAMPLES.

	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>	
Reduce	5	8	15	4	19	6	to centimes.
Ans.	29		77		98 centimes.		

If the number of deniers be 10 or 11, they are to be rejected, and in place of them you are to add 1 to the number of sols preceding, and then annex a cypher to it; one half of this is the centimes required.

EXAMPLES.

	<i>sol.</i>	<i>den.</i>	<i>sol.</i>	<i>den.</i>		<i>sol.</i>	<i>den.</i>	
Change	1	10	7	11	and	15	10	to centimes.
	2)20		2)80			2)160		
Ans.	10		40			80 centimes.		

Sols and deniers are reduced to centimes by the preceding rule, and though the result is not accurate, yet from its simplicity and conciseness it is generally used.

TABLES

FOR CHANGING LIVRES, SOLS AND DENIERS TO FRANCS
AND CENTIMES.

[N. B. The first is sufficiently exact for business ; in the second the answer is calculated to the ten-thousandths part of a centime.]

TAB. I.

TAB. II.

Deniers.	Fr. Cent.	Fr. Cent.	10,000ths of a centime.
1	0 0	0 0	4115
2	0 1	0 0	8230
3	0 1	0 1	2346
4	0 2	0 1	6461
5	0 2	0 2	0576
6	0 2	0 2	4691
7	0 3	0 2	8807
8	0 3	0 3	2922
9	0 4	0 3	7037
10	0 4	0 4	1152
11	0 5	0 4	5267
<i>Sols.</i>			
1	0 5	0 4	9383
2	0 10	0 9	8765
3	0 15	0 14	8148
4	0 20	0 19	7531
5	0 25	0 24	6914
6	0 30	0 29	6296
7	0 35	0 34	5679
8	0 40	0 39	5062
9	0 44	0 44	4444
10	0 49	0 49	3827
11	0 54	0 54	3210
12	0 59	0 59	2593
13	0 64	0 64	1975
14	0 69	0 69	1358
15	0 74	0 74	0741
16	0 79	0 79	0123
17	0 84	0 83	9506
18	0 89	0 88	8889
19	0 94	0 93	8272
<i>Livres.</i>			
1	0 99	0 98	7654
2	1 98	1 97	5309
3	2 96	2 96	2963
4	3 95	3 95	0617
5	4 94	4 93	8272
6	5 93	5 92	5926
7	6 91	6 91	3580
8	7 90	7 90	1235
9	8 89	8 88	8889
10	9 88	9 87	6543

<i>Livres.</i>		<i>Fr. Cent.</i>		<i>Fr. Cent.</i>	<i>10,000ths of a centime.</i>
12	.....	11	85	.....	11 85
15	.....	14	81	.....	14 81
20	.....	19	75	.....	19 75
24	.....	23	70	.....	23 70
30	.....	29	63	.....	29 62
40	.....	39	51	.....	39 50
50	.....	49	38	.....	49 38
60	.....	59	26	.....	59 25
70	.....	69	14	.....	69 13
72	.....	71	11	.....	71 11
80	.....	79	01	.....	79 01
90	.....	88	89	.....	88 88
95	.....	94	81	.....	94 81
100	.....	98	77	.....	98 76
200	.....	197	53	.....	197 53
300	.....	296	30	.....	296 29
400	.....	395	06	.....	395 06
500	.....	493	83	.....	493 82
1000	.....	987	65	.....	987 65
5000	.....	4938	27	.....	4938 27
10000	.....	9876	54	.....	9876 54

A TABLE

FOR REDUCING FRANCS AND CENTIMES TO LIVRES, SOLS AND DENIERS.

<i>Cent.</i>	<i>sol. den.</i>	<i>100ths of den.</i>	<i>Franco.</i>	<i>liv. sol. den.</i>
1	0 2 43	2	.....
2	0 4 86	3	.....
3	0 7 29	4	.....
4	0 9 72	5	.....
5	1 0 15	6	.....
10	2 0 30	7	.....
15	3 0 45	8	.....
20	4 0 60	9	.....
25	5 0 75	10	.....
30	6 0 90	15	.....
35	7 1 05	20	.....
40	8 1 20	30	.....
45	9 1 35	40	.....
50	10 1 50	50	.....
55	11 1 65	60	.....
60	12 1 80	70	.....
65	13 1 95	80	.....
70	14 2 10	90	.....
75	15 2 25	100	.....
80	16 2 40	200	.....
85	17 2 55	300	.....
90	18 2 70	400	.....
95	19 2 85	500	.....
			1000	.....
			5000	.....
			10000	.....

S P A I N.

SPANISH reckonings are of two sorts—

Money of plate, distinguished *hard* or *plate* dollars, &c.

Money of vellon, distinguished by *current* dollars.

The former is $88\frac{4}{7}$ per cent. above the latter.

100 reals plate being equal to $188\frac{4}{7}$ reals vellon.

100 reals vellon $53\frac{1}{8}$ do. plate.

17 reals plate 32 do. vellon.

17 piasters or current dollars 256 do. do.

4 maravadies make 1 quarto, $8\frac{1}{2}$ quartos or 34 maravadies 1 real.

The peso, piaster, or current dollar of 8 reals plate, passes at 15 reals vellon in trade, but in exchange it is estimated at 15 reals vellon 2 maravadies.

The ducat of exchange is 375 maravadies.

The real plate, is estimated 10 cents, and the real vellon at 5 cents, in the United States.

The Spanish arobe, is 25 lb.

100 lb. of Spain is 97 lb. English.

.....

To change reals vellon to reals plate.

RULE. Multiply the given sum by 17, and divide by 32 for reals plate.

EXAMPLE.

Change 800 reals vellon to reals plate.

$$\begin{array}{r}
 800 \\
 17 \\
 \hline
 32 \overline{)13600} 425 \\
 \underline{128} \\
 80 \\
 64 \\
 \hline
 160 \\
 160 \\
 \hline
 \end{array}$$

Ans. 425 reals plate.

To change reals plate to reals vellon.

RULE. Multiply the given sum by 32, and divide by 17 for reals vellon.

EXAMPLE.

In 425 reals plate, how many reals vellon ?

$$\begin{array}{r}
 425 \\
 32 \\
 \hline
 850 \\
 1275 \\
 \hline
 17 \overline{)13600} (800 \\
 \underline{136} \\
 00
 \end{array}$$

Ans. 800 reals vellon.

To change reals plate and reals vellon, to Federal money.

RULE. Multiply the reals plate by 10, and the reals vellon by 5, for the cents in the given sum.

EXAMPLES.

1. Change 14958 reals plate, to Federal money.

$$\begin{array}{r}
 14958 \\
 10 \\
 \hline
 1495,80
 \end{array}$$

Ans. 1495 dols. 80 cts.

2. Change 17593 reals vellon, to Federal money.

$$\begin{array}{r}
 17593 \\
 5 \\
 \hline
 879,65
 \end{array}$$

Ans. 879 dols. 65 cts.

.....

C A D I Z.

Accounts are kept by some in hard or plate dollars, reals vellon, and quartos.

8½ quartos make 1 real vellon.

20 reals vellon 1 dollar of plate.

Others keep their accounts in reals plate and maravadies, reckoning 34 maravadies to 1 real plate.

To bring reals plate to dollars.

RULE. Multiply the given sum by 32, and divide by 17 for reals vellon, and divide the reals vellon by 20 for dollars.

EXCHANGE.

EXAMPLE.

In 320 reals plate how many hard dollars ?

$$\begin{array}{r}
 320 \\
 32 \\
 \hline
 640 \\
 960 \\
 \hline
 17 \overline{)10240} (602 \text{ reals vellon} \\
 \underline{102} \\
 40 \\
 34 \\
 \hline
 6 \\
 8\frac{1}{2} \qquad 2 \overline{)0}60 \overline{)2} \text{ reals vellon} \\
 \hline
 17 \overline{)51} (3 \text{ quartos. dol. } 30 \ 2 \ 3 \\
 \underline{51}
 \end{array}$$

Ans. 30 dol. 2 r. v. 3 q.

To change hard dollars to reals plate.

RULE. Multiply the dollars by 20 for reals vellon, and the reals vellon being multiplied by 17 and divided by 32 give the reals plate required.—Or, Multiply the dollars by $10\frac{1}{2}$ for reals plate.

EXAMPLE.

In 16 hard dollars how many reals plate ?

$$\begin{array}{r}
 16 \\
 20 \\
 \hline
 320 \\
 17 \\
 \hline
 2240 \\
 320 \\
 \hline
 32 \overline{)5440} (170 \\
 \underline{32} \\
 224 \\
 224 \\
 \hline
 \end{array}
 \qquad
 \begin{array}{r}
 \text{Or thus,} \\
 16 \\
 10\frac{1}{2} \\
 \hline
 160 \\
 10 \\
 \hline
 170 \text{ R. P.}
 \end{array}
 \qquad
 \begin{array}{r}
 16 \\
 5 \\
 \hline
 8 \overline{)80} \\
 \hline
 10
 \end{array}$$

Ans. 170 reals plate.

PRACTICAL QUESTIONS,

The answers to which are in dollars, reals vellon, and quartos.

1. What will 45940 pipe staves come to at 80 piastres or current dollars per M. or 1200 ?

$$\begin{array}{r}
 45940 \\
 80 \\
 \hline
 12400 \overline{)36752100} \\
 \hline
 3062\frac{2}{3} \text{ current dollars.} \\
 8 \text{ reals.} \\
 \hline
 24501\frac{1}{3} \text{ reals plate.} \\
 32 \\
 \hline
 49002 \\
 73503 \\
 10\frac{2}{3} \\
 \hline
 17 \overline{)784042\frac{2}{3}} (46120 \\
 68 \\
 \hline
 104 \\
 102 \\
 \hline
 20 \\
 17 \\
 \hline
 34 \\
 34 \\
 \hline
 2\frac{2}{3} \\
 8\frac{1}{2} \\
 \hline
 17 \overline{)22\frac{2}{3}} (1 \\
 17 \\
 \hline
 5\frac{2}{3}
 \end{array}$$

$$\begin{array}{r}
 2,0 \overline{)4612,0} \\
 \hline
 \text{dols. } 2306 \text{ 0 1}
 \end{array}$$

Ans. 2306 h.dols. 0 r. 1 q.

- | | | piast. | | D. R. Q. |
|----|------------------------|-----------------|---------------|----------|
| 2. | 21800 barrel staves at | $30\frac{1}{2}$ | per 1200 | 417 3 7 |
| 3. | 1200 hhd. do. | 40 | do. | 30 2 3 |
| 4. | 2 casks sherry wine | 30 | per cask | 45 3 4 |

The result of the following is in reals plate, and maravadies.

5. In 610 hard dollars, how many reals plate?

$$\begin{array}{r}
 610 \\
 20 \text{ reals vellon} = 1 \text{ hard dollar.} \\
 \hline
 12200 \\
 17 \\
 \hline
 85400 \\
 12200 \\
 \hline
 32)207400(6481 \\
 192 \\
 \hline
 154 \\
 128 \\
 \hline
 260 \\
 256 \\
 \hline
 40 \\
 32 \\
 \hline
 8
 \end{array}$$

Ans. 6481 r.p. 8 mar.

6. What will 2632 barrels of flour come to, at 11 current dollars per barrel?

$$\begin{array}{r}
 2632 \\
 11 \\
 \hline
 \end{array}$$

28952 piastres or current dollars.

8 reals plate = 1 piastre or current dol.

Ans. 231616 reals plate.

7. 88 lasts of white dry salt, at 6 piastres per last.

$$\begin{array}{r}
 88 \\
 6 \\
 \hline
 528 \\
 8 \\
 \hline
 4224
 \end{array}$$

Ans. 4224 reals plate.

EXCHANGE.

18,

8. Change £.600 sterling to reals plate, exchange at $36\frac{1}{4}d.$ sterling per piastre.

$$\begin{array}{r}
 600 \\
 20 \\
 \hline
 12000 \\
 12 \\
 \hline
 36\frac{1}{4} \quad 144000 \\
 4 \quad \quad 4 \\
 \hline
 145 \quad 576000 \quad (\quad 3972 \text{ current dollars.} \\
 435 \quad \quad 8 \\
 \hline
 1410 \quad 31776 \\
 1305 \quad \quad 3 \quad 10 \\
 \hline
 1050 \quad 31779 \quad 10 \\
 1015 \\
 \hline
 350 \\
 290 \\
 \hline
 60 \\
 8 \\
 \hline
 145 \quad 480 \quad (3 \text{ reals.} \\
 435 \\
 \hline
 45 \\
 34 \\
 \hline
 180 \\
 135 \\
 \hline
 145 \quad 1530 \quad (10 \text{ maravadies.} \\
 145 \\
 \hline
 80
 \end{array}$$

Ans. 31779 r.p. 10 mar.

9. In £.3200 sterling how many reals plate, exchange at $36\frac{1}{4}d.$ sterling per piastre? Ans. 169489 r. p. 22 mar.

N. B. In St. LUCAR accounts are kept in Reals plate and Quartos, 16 quartos to 1 real plate.

EXCHANGE.

B I L B O A.

Accounts are kept in Reals vellon and Maravadies, 34 maravadies making 1 real.

The pound in Bilboa consists of 17 oz. except in iron which is but 16 oz.

32 velts are equal to 66 gallons in the U. States.

100 fanagues 152 bushels do.

100 varas 108 yards do.

To change piastres or current dollars to reals plate.

RULE. As 1 current dollar is to 15 reals 2 maravadies, so is the given sum to the reals required; or, multiply the sum by 15 reals 2 maravadies, for reals.

EXAMPLE.

In 5000 current dollars, how many reals vellon ?

2= $\frac{1}{17}$)5000

15 2=1 c. dol.

25000

5000

294 4

75294 4

Or thus, 5000

2

34)10000

294 4

Ans. 75294 r.vel. 4 mar.

.....

To change current dollars to sterling.

RULE. As 1 dollar is to the rate of exchange, so is the given sum to the sterling required.

EXAMPLE.

In 5000 piastres or current dollars, how many pounds sterling, exchange at $36\frac{2}{3}d.$ per dollar ?

As $\frac{p.}{1} : \frac{d.}{36\frac{2}{3}} :: \frac{p.}{5000}$

36 $\frac{2}{3}$

180000

1875

12)181875

210)151516 3'

Ans. £.757 16 3.

5000.

3

8)15000

1875.

To change sterling to current dollars.

RULE. As the rate of exchange is to 1 dollar, so is the given sum to the dollars required.

EXAMPLE.

In £.757 16s. 3d. sterling, how many current dollars, exchange at 36 $\frac{1}{2}$ d. sterling per dollar?

$$\begin{array}{rcl} d. & dol. & £. \ s. \ d. \\ \text{As } 36\frac{1}{2} & : 1 & :: 757 \ 16 \ 3 \end{array}$$
 Ans. 5000 cur. dols. or piast.

.....

To change sterling to reals vellon.

RULE. As the rate of exchange is to 15 reals 2 maravadies, so is the given sum to the reals required.

EXAMPLE.

In £.436 10s. sterling, how many reals vellon, exchange at 36 $\frac{1}{2}$ d. sterling per current dollar?

$$\begin{array}{rcl} d. & r. \ m. & £. \ s. \\ \text{As } 36\frac{1}{2} & : 15 \ 2 & :: 436 \ 10 \end{array}$$

$$\begin{array}{r} 8 \\ \hline 291. \end{array}$$

$$\begin{array}{r} 20 \\ \hline 8730 \\ 12 \end{array}$$

$$\begin{array}{r} 104760 \\ 8 \end{array}$$

$$\begin{array}{r} 2 \text{ marv.} = 1 \\ \hline 838080 \\ 15 \ 2 \end{array}$$

$$\begin{array}{r} 4190400 \\ 838080 \\ 49298 \end{array}$$

$$\begin{array}{r} 291 \ 12620498 \ (43369 \\ 1464 \end{array}$$

$$\begin{array}{r} 980 \\ 873 \\ \hline 1074 \\ 873 \end{array}$$

$$\begin{array}{r} 2019 \\ 1146 \end{array}$$

2738

2619

119

34 mar. = 1 rial.

291)4046(13.

Q. 2.

$$\begin{array}{r} \text{Or, } 888080 \\ 2 \end{array}$$

$$\begin{array}{r} 34 \ 1676160 \text{ mar.} \\ \hline 42298 \text{ reals.} \end{array}$$

Ans. 43369 reals 13 mar.

PRACTICAL QUESTIONS.

1. What will 122 quintals of fish come to, at 136 reals per quintal?

$$\begin{array}{r}
 122 \\
 136 \\
 \hline
 732 \\
 366 \\
 122 \\
 \hline
 \end{array}$$

Ans. 16592 reals.

2. What is the crantage of 1137 quintals of fish, at 10 maravedies per quintal? Ans. 334 R. 14 M.

.....

BARCELONA.

The monies of account in Barcelona and throughout the Province of Catalonia are Livres, Sols and Deniers.

12 deniers make 1 sol.

20 sols 1 livre.

37½ sols, or 1½ livre 1 hard dollar.

28 sols 1 cur. dol. the piast. of exchange.

To change livres to hard dollars.

RULE. Divide the livres by 3 and then by 5 and add the two quotients together for hard dollars.

EXAMPLES.

1. How many hard dollars in 360 livres?

$$\begin{array}{r}
 3 \overline{) 360} \\
 \underline{360} \\
 5 \overline{) 120} \\
 \underline{120} \\
 72 \\
 \underline{72} \\
 192
 \end{array}$$

Ans. 192 hard dols.

2. How many hard dollars must be paid for an invoice of goods amounting to 7134 livres?

$$\begin{array}{r}
 3 \overline{) 7134} \\
 \underline{7134} \\
 5 \overline{) 2378} \\
 \underline{2378} \\
 1426\frac{2}{5} \\
 \underline{1426\frac{2}{5}} \\
 3804\frac{4}{5}
 \end{array}$$

Ans. 3804 h.d. 30 sols.

To change hard dollars to livres.

RULE. Add to the given sum, the half, quarter, and eighth of it, and the sum will be the livres required.

EXAMPLES.

1. In 192 hard dollars, how many livres ?

$$\begin{array}{r|l} \frac{1}{2} & 192 \\ \frac{1}{4} & 96 \\ \frac{1}{8} & 48 \\ \hline & 24 \end{array}$$

360.

Ans. 360 livres.

2. How many livres in 3804½ hard dollars ?

$$\begin{array}{r|l} \frac{1}{2} & 3804,8 \\ \frac{1}{4} & 1902,4 \\ \frac{1}{8} & 951,2 \\ \hline & 475,6 \end{array}$$

7134,0.

Ans. 7134 livres.

To change livres to current dollars.

RULE. Multiply the livres by 5 and divide that product by 7 for current dollars.

EXAMPLE.

Change 2716 livres to current dollars.

$$\begin{array}{r} 2716 \\ 5 \\ \hline 7 \overline{)13580} \\ \hline 1940 \end{array}$$

Ans. 1940 cur. doll.

To change current dollars to livres.

RULE. Multiply the current dollars by 7 and divide the product by 5 for livres.

EXAMPLE.

Change 1940 current dollars to livres.

$$\begin{array}{r} 1940 \\ 7 \\ \hline 5 \overline{)13580} \\ \hline 2716 \end{array}$$

Ans. 2716 livres.

EXCHANGE.

P O R T U G A L.

Accounts are kept in Millreas and Reas, reckoning 1000 reas to 1 millrea of 5s. 7½d. sterling, or 1 dol. 25 cts. in the U. States.

A vinten is 20 reas, and 5 vintens is a festoon of 100 reas.

1. Change 579 millreas 740 reas to Federal, at 1 dol. 25 cts. per millrea.

579,740	Or thus, 579,740
1,25	½ added 144,935
<u>2898 700</u>	
69568 80	Dollars 724,675

Cents 72467,500

Ans. 724 dols. 67½ cts.

2. Change 724 dols. 67½ cts. to millreas, at 1 dol. 25 cts. per millrea.

1,25)724,675 (579 mill. 740 reas.

Or, deducting ½ from the sum in Federal money gives the millreas, &c.

Example.	½)724,675
	<u>144,935</u>
	579,740 as before.

3. Change 579 millreas 750 reas to sterling, at 5s. 7½d. per millrea.

579,750
<u>67½</u>
4058,250
34785,00
<u>289,875</u>
12)39133,125
<u>2|0)326|1 1</u>

Ans. £.163 1 1½

4. In £.163 1 1½ sterling, how many millreas, at 5s. 7½d. per millrea?

s.	d.	reas.	£.	s.	d.
5	7½	: 1000	::	163	1 1½

Ans. 579 mill. 750 reas.

5. What is the commission on 6245 mill. 46 reas, at $2\frac{1}{2}$ per cent. ?

$$\begin{array}{r} 6245,046 \\ 2\frac{1}{2} \text{ per } 1,00 \\ \hline 12490092 \\ 3122523 \\ \hline \end{array}$$

156,12615 Ans. 156 mill. 126 reas.

6. Suppose a cargo is sold for 6245 millreas, at 2 months credit, for prompt payment of which $\frac{1}{2}$ per cent. per month is allowed ; how much is the discount ?

$$\frac{1}{2})6245$$

$$\begin{array}{r} 31,225 \text{ for } 1 \text{ month.} \\ 2 \\ \hline \end{array}$$

Ans. 62,450 for 2 months.

Or thus,

$$\frac{1}{2} \text{ per cent. for 2 months} = 1 \text{ per cent.}$$

$$\begin{array}{r} 6245 \\ 1 \\ \hline \end{array}$$

62,45

7. Suppose you import 5960 hhd. staves and 5060 barrel staves on which there is a duty of 23 per cent. which is taken in kind, how many of each remain for sale ?

Ans.. 4590 hhd. and 3897 bbl.

	M. R.	M. R.
8. 702 barrels of flour at 8,600 per bbl.	6037,200	
9. 4590 hhd. staves ,030 per stave....	137,700	
10. 3897 bbl. do. ,020 per do.....	77,940	
11. 71 alquiers of beans .. ,480 per alquier ..	34,080	

MEASURES OF PORTUGAL.

Cloth Measure.

A vara is $43\frac{1}{8}$ inches English.

A covado is $20\frac{3}{4}$ ditto.

Wine Measure.

1 almude is 12 canados.

1 canado is 4 quarteels.

An almude is $4\frac{1}{2}$ gallons English wine measure.

A canado is 3 pints English.

Corn Measure.

1 moy is 15 fangas.

1 fanga is 4 alquiers.

1 moy of 60 alquiers is 3 English quarters, or 24 bushels Winchester measure.

1 quarter is 20 alquiers.

1 English bushel is $2\frac{1}{2}$ alquiers in Lisbon, 2 alquiers in Oporto, and $2\frac{3}{4}$ alquiers in Figuiras.

A moy of salt is the same measure as corn.

A pipe of coals is 16 fangas.

1 fanga is 8 alquiers.

A pipe of coals is 128 alquiers, which at $2\frac{1}{2}$ alquiers per bushel, is $51\frac{1}{2}$ bushels English.

WEIGHTS OF PORTUGAL.

1 quintal is 4 arabes.

1 arabe is 32 pounds, so that a quintal is 128 lb. Portugal wt. which is equal to about 132 lb. English, avoirdupois weight.

A pound is about $16\frac{1}{2}$ ounces English.

Loss by exchanging English money in Portugal.

An English guinea passes at Lisbon for 3 m. 600 r. which is 134 reas, or 9 pence less than the value.

An English crown passes for 800 reas, which is 89 reas, or 6 pence less than the value.

An English shilling passes for 160 reas, which is 18 reas, or about $1\frac{1}{4}$ penny less than the value.

.....

L E G H O R N.

Accounts are kept in Piastres, Soldi, and Denari, reckoning 12 denjers to 1 soldo, and 20 soldi to 1 piastre or dollar of 48d. sterling at par.

$1\frac{1}{2}$ paul, or 2 sols, are equal to 1 livre.

6 livres 1 piastre or dollar.

$5\frac{1}{2}$ livres (effective money) 1 do.

1 ducat $1\frac{1}{4}$ do.

Weights—A pound is only 12 ounces in all commodities.

145 lb. is said to be equal to the English quintal of 112 lb.; but fish generally renders about 136 to 138 lb. per quintal.

145 lb. in Leghorn make 112 lb. in the U. States.

4 brasses 1 cane.

100 brasses 64 yards, U. States.

1 palm $9\frac{1}{2}$ inches, do.

4 sacks are 2 per cent. less than an English quarter, of 8 bushels.

1. How much will 5630 lb. of ginger come to, at 9 piastres per 100?

$$\begin{array}{r} 5630 \\ 9 \\ \hline 506\overline{)70} \\ 20 \\ \hline 14\overline{)00} \end{array}$$

Ans. 506 piast. 14 sol.

2. What will 9760 lb. of pepper come to, at $27\frac{1}{2}$ ducats per 100?

$$\begin{array}{r} 9760 \\ 27\frac{1}{2} \\ \hline 68320 \\ 19520 \\ 2440 \\ \hline 265960 \\ 44326\frac{1}{2} \\ \hline \text{piast. } 3102\overline{)86\frac{2}{3}} \\ 20 \\ \hline \text{soldi } 17\overline{)33\frac{1}{2}} \\ 12 \\ \hline \text{den. } 4\overline{)00} \end{array}$$

Ans. 3102 piast. 17 sol. 4 den.

3. What will 143700 lb. of pitch come to, at 26 pauls per 100 ?

NOTE. 1 paul is equal to $\frac{2}{3}$ of a livre.

$$\begin{array}{r}
 143700 \\
 \times 26 \\
 \hline
 862200 \\
 287400 \\
 \hline
 37362,00 \text{ pauls.} \\
 2 \\
 \hline
 3)74724 \\
 \hline
 6)24908 \text{ livres.} \\
 \hline
 4151 \text{ 6 8}
 \end{array}$$

Ans. 4151 piast. 6 sol. 8 den.

4. How much will 4200 sacks of wheat come to, at 26 livres, effective money, per sack ?

$$\begin{array}{r}
 4200 \\
 \times 26 \\
 \hline
 25200 \\
 8400 \\
 \hline
 \text{Liv.} \quad \text{piast.} \\
 5\frac{3}{4} : 1 :: 109200 \text{ livres.}
 \end{array}$$

Ans. 18991 piast. 6 sol. 1 den.

			piast. s. d.
5.	100 barrels pork ..	16 piastres per barrel	1600 0 0
6.	1000 do. flour ..	10 $\frac{1}{2}$ do.	10500 0 0
7.	2660 lb. coffee	26 do. per 100	691 12 0
8.	6578 lb. pimento ..	18 do. do.	1184 0 9
9.	9370 lb. rice	24 liv. cur. money per 100..	374 16 0
10.	97270 lb. logwood ..	16 piastres per 1000	1556 6 4
11.	4170 lb Russia wax	33 $\frac{1}{2}$ ducats per 100	1629 15 6
12.	104060 lb. sugar	30 piastres per 151 lb.	20674 3 5
13.	3350 lb. loaf sugar ..	30 do. per 100	1005 0 0
14.	1000 casks tar	4 $\frac{1}{2}$ do. per cask	4500 0 0
15.	100000 staves	4 do. per 100	4000 0 0

N A P L E S.

Accounts are kept in Ducats and Grains, reckoning 100 grains to 1 ducat.

The current coins are grains, carlins, ducats, dollars, and ounces.

10 grains make 1 carlin; 10 carlins 1 ducat; 3 ducats 1 ounce.

The Naples dollar passes for 120 grains, and the Spanish dollar for 126 grains.

100 lb. Naples weight are equal to 64½ lb. English.

Brandy is sold per cask of 12 barrels, or 132 gallons; 60 karafts make a barrel.

Sewing silks are sold per lb. of 12 ounces.

Lustrings are sold per cane of 84 inches.

Sugar, coffee, fish, and tobacco, are sold per cantar, of 196 lb. in the United States.

The cantar is subdivided into 100 rotolas of 33 ounces each.

1. What is the amount of 10 casks 6 barrels 29 karafts of brandy, at 92 ducats per cask?

$$\begin{array}{r}
 92 \\
 10 \\
 \hline
 920 \\
 6 \text{ bbl. } \frac{1}{2} \quad 46 \\
 20 \text{ kar. } \frac{1}{18} \quad 2 \ 55 \\
 5 \text{ do. } \frac{1}{2} \quad 64 \text{ nearest.} \\
 4 \text{ do. } \frac{1}{3} \quad 51 \\
 \hline
 969 \ 70
 \end{array}$$

Ans. 969 ducats, 70 grains.

2. What is the amount of 2 casks of clayed sugar, weighing neat 10 cantars 51 rotolas, at 65 dollars per cantar?

$$\begin{array}{r}
 \text{rot.} \quad \text{dols.} \quad \text{rot.} \\
 100 : 65 :: 1051 \\
 65 \\
 \hline
 5255 \\
 6306 \\
 \hline
 \text{duc. } 683,15
 \end{array}$$

$$\begin{array}{r}
 \text{Or thus,} \quad 65 \\
 10 \\
 \hline
 650 \\
 30 \text{ rot. } \frac{1}{2} \quad 32 \ 50 \\
 1 \text{ do. } \frac{1}{50} \quad 65 \\
 \hline
 \text{duc. } 683 \ 15
 \end{array}$$

Ans. 683 ducats, 15 grains.

3. How much is the amount of 1 box of scented soap, containing 100 parcels of 16 ounces each, at 22 grains per rotola ?

100

16

oz. gr.

33 : 22 :: 1600 oz. : Ans. 10 ducats, 66 grains.

4. What is the commission on 996 ducats, at 2 per cent. ?

Ans. 19 ducats, 92 grains.

	<i>can. rot.</i>		<i>ducats.</i>		<i>due. gr.</i>
5.	3 73	of coffee	73	per cantar ..	272 29
6.	16 19 $\frac{3}{4}$	soap	21	.....	340 14
7.	1 59	do.....	21	.....	33 39
8.	7 97 $\frac{3}{4}$	do.....	21	.....	167 52
9.	67 $\frac{1}{2}$	scented ditto	30	.....	20 25
10.	52	white ditto	17	.....	8 84
11.	7 64	raisins	12	.....	91 68
12.	2 casks 11 bbls. 4 kar.	of brandy 102 per cask ..			298 06
13.	..... 10 do. 43 do.	ditto .. 92 do.....			82 16
14.	..... 9 do. 12 do.	ditto .. 92 do.....			70 53
15.	355 canes of silk	2 50 per cane			887 50

.....

T R I E S T E.

Accounts are kept in Florins and Kreutzers—60 kreutzers make 1 florin.

The exchange on London, (8th July, 1803,) was 12 florins for the pound sterling.

The other kinds of money are Soldi and Livres.

20 soldimake..... 1 livre.

5 $\frac{1}{4}$ livres..... 1 florin.

100 lb. Vienna weight = 123 lb. Avoirdupois.

A brace is 27 inches, or $\frac{3}{4}$ of a yard English.

A barrel of wine is 18 gallons.

A staro of wheat is 2 $\frac{3}{8}$ bushels nearly—3 $\frac{1}{2}$ staros is equal to an English quarter of 8 bushels.

Sales and purchases are usually made in bills on Vienna at 3 months date.

1. What is the amount of 263 lb. Vienna weight, of soap, at 22 kreutzers per lb. ?

$$\begin{array}{r}
 263 \\
 22 \\
 \hline
 526 \\
 526 \\
 \hline
 6 \overline{) 578} 6 \\
 \hline
 96 \ 26
 \end{array}$$

Ans. 96 flor. 26 kreutzers.

2. 758 gallons wine, at 21 florins 30 kreutzers per barrel ?

$$\begin{array}{r}
 758 \\
 21 \\
 \hline
 758 \\
 1516 \\
 30 \text{ kr. } \frac{1}{2} \quad 379 \\
 \hline
 18 \overline{) 16297} (905 \\
 \underline{162} \\
 97 \\
 90 \\
 \hline
 7 \\
 60 \\
 \hline
 18 \overline{) 420} (23 \\
 \underline{36} \\
 60 \\
 54 \\
 \hline
 6
 \end{array}$$

Ans. 905 fl. 23½ kr.

- | | fl. | kr. | | fl. | kr. |
|---|------|------|-----|-----|-----|
| 3. 120 staros of wheat at 4 20 per staro. | Ans. | 520 | 00. | | |
| 4. 715 braces of silk..... 3 50 per brace. | | 2740 | 50. | | |
| 5. 1730 lb. coffee 58 per lb. | | 1672 | 20. | | |

G E N O A.

Accounts are kept in Denarii, Soldi, and Pezzos or Lires.

12 denarii.....make.....1 soldi.

20 soldi.....1 pezzo or lire.

1 pezzo of exchange $5\frac{3}{4}$ lires.

The course of exchange is various—from 47*d.* to 58*d.* sterling per pezzo or lire.

In Milan, 1 crown = 80 soldi of Genoa.

.. Naples, 1 ducat = 86 do.

.. Leghorn, 1 piastre = 20 do.

.. Sicily, 1 crown = $127\frac{2}{3}$ do.

To reduce Exchange money to Lire money.

RULE. Multiply the exchange money by $5\frac{3}{4}$ for lire money.

EXAMPLE.

In 384 pezzos of exchange how many lires ?

$$\begin{array}{r}
 384 \\
 5\frac{3}{4} \times \\
 \hline
 1920 \\
 192 \\
 96 \\
 \hline
 2208
 \end{array}$$

Ans. 2208 lires.

To reduce Lire money to Exchange.

RULE. Multiply the lire money by 4 and divide the product by 23 for exchange.

EXAMPLE.

In 2208 lires how many pezzos of exchange ?

$$\begin{array}{r}
 2208 \\
 4 \times \\
 \hline
 23)8832(384 \\
 69 \\
 \hline
 193 \\
 184 \\
 \hline
 92 \\
 92 \\
 \hline
 \text{—}
 \end{array}$$

Ans. 384 pezzos of exchange.

To reduce Lires to Sterling.

RULE. As 1 lire is to the rate of exchange so is the lires to the sterling required.

EXAMPLE.

In 360 lires how much sterling, exchange at 54*d.* sterling per lire?

$$\begin{array}{rclcl} \textit{l.} & & \textit{d.} & & \textit{l.} \\ 1 & : & 54 & :: & 360 \\ & & & & 54 \end{array}$$

$$\begin{array}{r} 1440 \\ 1800 \\ \hline \end{array}$$

$$12 \overline{) 19440}$$

$$2 \overline{) 162 \overline{) 0}}$$

$$\pounds .81$$

$$\text{Ans. } \pounds .81 \text{ } 0 \text{ } 0 \text{ sterl.}$$

.....

V E N I C E.

Venice has three kinds of money, viz. Banco money, Banco current money, and Picoli money. Banco money is 20 per ct. better than banco current, and banco current 20 per ct. better than picoli.

The different denominations of money are Denari, Soldi, Grosi, and Ducats.

12 denari, or deniers d'or, make 1 soldi, or sol d'or.

5½ soldi 1 gros, or grosi.

24 gros, or grosi 1 ducat.

100 ducats banco of Venice in Leghorn	=	93 pezzos.
..... Rome	=	68½ crowns.
..... Lucca	=	77 do.
..... Frankfort	=	139½ florins.

The par of exchange in 1798 was 50½*d.* sterling per ducat banco.

EXAMPLE.

How much sterling is equal to 2712 ducats banco, exchange at 50½ d. sterling per ducat banco?

$$\begin{array}{rcl}
 \text{duc.} & \text{d.} & \text{duc.} \\
 1 & : 50\frac{1}{2} & :: 2712 \\
 & 4 & 201 \\
 \hline
 & 201 & 2712 \\
 & & 54240 \\
 \hline
 & & 4)545112 \text{ farth..} \\
 & & \hline
 & & 12)136278 \text{ pence.} \\
 & & \hline
 & & 2|0)1135|6 \text{ 6 shills..} \\
 & & \hline
 \end{array}$$

Ans. £.567 16 6 sterling.

.....

S M Y R N A.

Accounts are kept in piastres and hundredths, except the English accounts, which from ancient custom are kept in piastres and eightieths or half paras.

The fractional parts are sometimes called aspers, 100 aspers to 1 piastre.

The following calculations are made in piastres and hundredths.

A piastre is equal to 40 paras, and a Spanish dollar to 136 paras.

340 piastres are equal to 100 Spanish dollars.

The exchange on London was 13 piastres for 1 pound sterling, May 14th, 1800.

Their weights are the Rotola, Oke, Cheque and Tiffec—

A rotola marked *Ro.* is 180 drams.

An oke % is 400 do.

A cheque of opium is 250 do.

do. of groat's wool is 800 do. or 2 okes.

A tiffec of silk is 610 do.

100 rotolas, or 1800 drams, or 45 okes are a quintal of this country.

112 lb. English should render here 40½ okes, or 90½ rotolas.

45 okes of this country render 123½ lb. English.

4 pike is 27 inches nearly.

EXCHANGE.

109

To change piastres to dollars.

RULE. Multiply the piastres by 5, and divide the product by 17, for cents.

EXAMPLE.

Change 1277⁵⁵/₁₀₀ piastres to dollars.

1277,55

5

17)6387,75(375,73

51

128

119

97

85

127

119

85

85

Ans. 375 dols. 73 cts.

To change dollars to piastres.

RULE. Multiply the dollars by $3\frac{2}{5}$ for piastres.

EXAMPLE.

Change 375 dollars 75 cents to piastres.

375,75

$3\frac{2}{5}$

1127,25

75,15

75,15

} for $\frac{2}{5}$

Ans. 1277,55 piastres.

.....

PRACTICAL QUESTIONS.

1. How much will 10 serons of cochineal come to, weighing neat 724 okes 73 rotolas, at 80 piastres per oke?

724,73

80

Ans. 57978,40 piastres.

2. 299 bags of sugar, weighing 506 quintals 96 rotolas, tare 14 rotolas per bag, at 110 piastres per quintal.

gross	506 96	299
tare	41 86	14
	<hr/>	<hr/>
neat	465 10	1196
	110	299
	<hr/>	<hr/>

Ans. 5116L 00 piast. 100)4186

41 86

3. 4 cases of opium, weighing gross 1026 rotolas, tare 84 okes 75 rotolas, at 10½ piastres per cheque.

Note. 1 rotola is equal to $\frac{2}{3}$ of an oke, and 1 oke to $1\frac{3}{4}$ cheque.

rot. 1026
9

20)9234 rot.

gross okes 461 70
tare 84 75

neat okes 376 95
1½

376 95
3

376 95
226 17

5)1130 85
226 17

cheques 603 12
10½

6031 20
301 56
150 78

Ans. piast. 6483 54

4. 893 pieces of copper, neat okes 19743,85, at $\frac{70}{100}$ or 70 paras per oke.

O. R.
19743,85
70

4)013820695|0

Ans. piast. 34551,73

5. What is the custom-house duty on 19740 okes of copper at $\frac{2\frac{1}{2}}{100}$ agio $2\frac{1}{2}$ per cent.?

NOTE. The charges are all established by a tariff of the Levant Company.

$$\begin{array}{r} 19740 \\ \times 2\frac{1}{2} \\ \hline 39480 \\ 9870 \\ \hline 49350 \end{array}$$

agio $2\frac{1}{2} = \frac{1}{100}$ 1233,75 amount of duty at $2\frac{1}{2}$ paras.
30,84 agio at $2\frac{1}{2}$ per cent.

Ans. piast. 1264,59

6. English consulage on 430 quintals, at $5\frac{1}{2}$ piast. agio 7 per cent.

$$\begin{array}{r} 430 \\ \times 5\frac{1}{2} \\ \hline 2150 \\ 215 \\ \hline 2365 \\ 7 \\ \hline \end{array}$$

Ans. piast. 165,55

7. Custom-house duties on 88 quintals 90 rotolas, at $\frac{22}{100}$ agio $2\frac{1}{2}$ per cent.

$$\begin{array}{r} 88,90 \\ \times 20 \\ \hline 1110)177800 \\ \hline 22 = \frac{1}{100} 16,16 \\ ,40 \\ \hline \end{array}$$

Ans. piast. 16,56

EXCHANGE.

8. What will the following charges amount to, viz. portorage $\frac{8}{10}$, house porters $\frac{4}{10}$, weighing $\frac{2}{10}$, chan duty $\frac{2}{10}$, visiting and marketing $\frac{1}{10}$ per quintal on 438 quintals?

portorage	8	438
house porters ..	4	17
weighing	2	
chan duty	2	
visiting	1	
	<hr/>	<hr/>
	17	4|0)744|6

Ans. piast. 186,15.

.....

ENGLISH WEST-INDIES.

Accounts are kept in Pounds, Shillings, and Pence.

....

JAMAICA AND BERMUDAS.

The Spanish dollar passes at 6s. 8d.; 3 dollars are equal to 20 shillings, or 1 pound, Jamaica currency.

To change Jamaica currency to Federal.

RULE. Multiply the pounds by 3 for dollars. If there be shillings, &c. increase the pence in the given sum by $\frac{1}{4}$ for cents.

EXAMPLES.

1. When lumber is sold in Jamaica at £.15 per M. how much is it in Federal money?

15
3

Ans. 45 dols.

2. Change £.54 12s. 11d. Jamaica currency to Federal.

54 12 11
20

1092
12

1)13115
32783

163,933 cts.

Ans. 163 dols. 933 cts.

3. What will 102,896 feet of boards come to, at £.15 per M.?

$$\begin{array}{r}
 102,896 \\
 15 \\
 \hline
 514480 \\
 102896 \\
 \hline
 \text{£.}1543,440 \\
 20 \\
 \hline
 \text{s. } 8,800 \\
 12 \\
 \hline
 \text{d. } 9,600
 \end{array}$$

Ans. £.1543 8 9

4. What will 5 hds. of sugar come to, weighing 8519 lb. neat, at 70 shillings per 100 lb.?

$$\begin{array}{r}
 8519 \\
 70 \\
 \hline
 2|0)59613,30 \\
 \hline
 \text{Ans. £.}298 \ 3 \ 3
 \end{array}$$

5. How much will 5 hds. of sugar come to, weighing 9103 lb. neat, at 75 shillings per 100 lb.?

$$\begin{array}{r}
 9103 \\
 75 \\
 \hline
 45515 \\
 63721 \\
 \hline
 2|0)68217,25 \\
 \hline
 \text{Ans. £.}341 \ 7 \ 3
 \end{array}$$

.....

BARBADOES.

The Spanish dollar is 6s. 3d. Barbadoes currency.

To change Barbadoes currency to Federal.

RULE. Increase the pence in the given sum by $\frac{1}{3}$ for cents.

EXAMPLE.

Change £.49 11s. 10d. Barbadoes money to Federal.

		Proof $\frac{1}{3}$)15869 $\frac{1}{3}$ cents.
£.49 11 10		3967 $\frac{1}{3}$
20		
991	12)11902 pence	
12		
	240)991 10	
$\frac{1}{3}$)11902		£.49 11 10
3967 $\frac{1}{3}$		
158,69 $\frac{1}{3}$		

Ans. 158 dols. 69 $\frac{1}{3}$ cents.

Other calculations as in Jamaica.

.....

MARTINICO, TOBAGO, AND ST. CHRISTOPHERS.

These islands being inhabited by French and English, the former keep their accounts in Livres, Sols, and Deniers, and the latter in Pounds, Shillings, and Pence.

A *current* dollar is 8s. 3d.
A *round* dollar passes for 9s.

When payment of freight or goods is mentioned in Spanish dollars, disagreement respecting their value has frequently arisen; and to prevent it, some persons distinguish them by *round* and *current* dollars; others mention the *bits* to each. But the most certain way is to specify the number of shillings or livres, instead of dollars; thus A sells to B a barrel of flour, at 99 shillings or livres; in payment B may allow him 11 dollars at 9 shillings each, or 12 dollars at 8s. 3d. each, either being equal to 99 shillings or livres, the sum specified by their agreement.

.....

FRENCH WEST-INDIES.

Accounts are kept in Livres, Sols, and Deniers.

12 deniers make 1 sol, and 20 sols 1 livre.

The Spanish dollar passes in some places for 8 livres 5 sols, and in others for 9 livres.

1 cwt. or 112 lb. in the U. States is equal to 104 lb. French.

100 lb. French are equal to 108 lb. nearly, in the U. States.

When any commodity is to be marked in French weight, 10 per cent. is added to the neat hundreds; thus a hogshead of fish weighing neat 10 cwt. is marked 1040 lb. Fish shipped from the United States will answer to the weight thus marked, provided it comes out in good order, and the *cask* weighs exactly the customary tare, which is 10 per cent.

100 lb. of coffee or cotton, bought in the French islands, will, or ought to weigh 108 lb. (it will often weigh 110 lb.) in the United States; and as these articles are sold here per lb. there is a gain of 8 to 10 per cent. in the weight. But on sugar, which is bought for 100 lb. and sold here per 112, there is a loss of 6 per cent. because there is 4 per cent. between the American cwt. and 100 lb. French, and 2 per cent. difference in the tare. The tare on brown sugar in the French islands being 10 per cent. and the American tare 12 per cwt. The loss on clayed sugar is greater, occasioned by the customary tare, which is but 7 per cent. in the French islands, whereas it is here 12 per cent. the same as on brown sugar.

NOTE. The tare allowed on sugar among merchants is 12 per 112; that allowed by the custom-house is 12 per 100. [See *Tare and Tret*, page 95.]

....

1. Change 10692 livres to dollars, at $8\frac{1}{4}$ livres per dollar.

$$\begin{array}{r}
 8\frac{1}{4} \quad 10692 \\
 \underline{4} \qquad \underline{4} \\
 33 \) \ 42768(1296 \\
 \underline{33} \\
 97 \\
 \underline{66} \\
 316 \\
 \underline{297} \\
 198 \\
 \underline{198}
 \end{array}$$

Ans. 1296 dols.

2. Change 7713 livres to dollars, at 9 livres per dollar.

$$\begin{array}{r} 9 \overline{)7713} \end{array}$$

Ans. 857 dollars.

3. In 1296 dollars, at $8\frac{1}{2}$ livres each, how many livres?

$$\begin{array}{r} 1296 \\ 8\frac{1}{2} \overline{)1296} \\ \underline{10368} \\ 324 \end{array}$$

Ans. 10692 livres.

4. 857 dollars, at 9 livres each, how many livres?

$$\begin{array}{r} 857 \\ 9 \overline{)857} \end{array}$$

Ans. 7713 livres.

5. What will 1642 lb. of coffee come to at 15 sols per lb.?

$$\begin{array}{r} 1642 \\ 15 \overline{)1642} \\ \underline{8210} \\ 1642 \end{array}$$

2|0)2463|0 sols.

livres 1231 10 Ans. 1231 liv. 10 sols.

6. 1780 lb. cotton at 157 livres 10 sols per 100 lb.

$$\begin{array}{r} 1780 \\ 157 \overline{)1780} \\ \underline{12460} \\ 8900 \\ 1780 \overline{)8900} \\ \underline{890} \\ 10 \text{ sols. } \frac{1}{2} \end{array}$$

$$\begin{array}{r} \text{liv. } 2803|50 \\ 20 \overline{)2803|50} \\ \underline{10|00} \end{array}$$

Ans. 2803 liv. 10 sols.

7. 24 barrels of beef at 101 liv. 1 sol 3 den. per barrel.

liv.	s.	d.
101	1	3
		6
<hr/>		
606	7	6
		4
<hr/>		
2425	10	0

Ans. 2425 liv. 10 sols.

8. How many dollars, at 8 livres 5 sols per dol. will pay for 12 hhd. of brown sugar, weighing 13365 lb. at 40 liv. per 100 lb.?

	13365
	40
	<hr/>
8½	5345,00
4	4
	<hr/>
33)	21384(648 dols.
	198
	<hr/>
	158
	132
	<hr/>
	264
	264
	<hr/>

Ans. 648 dols.

9. A cargo, amounting to 12536 dols. in the United States is sold at 12½ per cent. advance on the invoice; how many livres will it amount to, estimating the dollar at 8½ livres each?

	12½ = 1/8) 12536 invoice.
	1567 advance.
	<hr/>
	14103 amount.
	8
	<hr/>
	112824 livres at 8 per dollar.
5 sols ½	3525½
	<hr/>
	Ans. 116349½ livres at 8½ per dollar.

EXCHANGE.

		<i>sol.</i>	<i>d.</i>	<i>liv</i>	<i>s.</i>	<i>d.</i>
10.	6 hhds. coffee, weighing 4471 lb. at 14 6 per lb.	3241	9	6		
11.	14 do. sugar, do. 16477	38	liv.	per 100	6261	5 2
12.	1 bale of cotton, do. .. 227	150	....	do. ..	340	10 0
13.	94 hhds. fish, .. do. 101313	33	....	do. ..	33433	5 9
14.	16 casks of rice, do. .. 6375	40	10..	do. ..	2662	17 6
15.	1390 hoops	480	....	per M.	667	4 0
16.	15059 feet of boards	100	....	do. ..	1503	18 0
17.	48 shaken hhd. with heads.	7	15	per hhd.	372	0 0
18.	29 barrels of beef	90	15	per bbl.	2631	15 0
19.	6739 velt of molasses	26	per velt		8786	14 0
20.	32670 gals. do. at 73l. 7s. 9d. per tierce of 60 gals.	39959	9	10		

.....

SPANISH WEST-INDIES.

Accounts are kept in Havanna, Lagaira, Vera Cruz, &c. in dollars and reals, reckoning 8 reals to a dollar.

The Spanish arabe is 25 lb.

....

1. What will 123 pieces Bretagnes come to, at 26 reals per piece ?

$$\begin{array}{r}
 123 \\
 26 \\
 \hline
 738 \\
 246 \\
 \hline
 8)3198
 \end{array}$$

399 6 Ans. 399 dols. 6 reals.

2. 21784 feet boards, at 45 dollars per thousand.

$$\begin{array}{r}
 21784 \\
 45 \text{ per M.} \\
 \hline
 108920 \\
 87136 \\
 \hline
 980280
 \end{array}$$

$$\begin{array}{r}
 980280 \\
 8 \\
 \hline
 21240
 \end{array}$$

21240.

Ans. 980 dols. 2 reals.

3. 153 cases of gin, at $8\frac{6}{8}$ dollars per case.

$$\begin{array}{r}
 153 \\
 8\frac{6}{8} \\
 \hline
 1224 \\
 4 \text{ reals} \quad 76 \quad 4. \\
 2 \text{ do.} \quad 38 \quad 2 \\
 \hline
 1338 \quad 6.
 \end{array}$$

Ans. 1338 dols. 6 reals.

4. What is the commission on 14792 dollars 5 reals, at 4 per cent.?

$$\begin{array}{r}
 14792 \quad 5 \\
 4. \\
 \hline
 591 \overline{) 70} \quad 4. \\
 8 \\
 \hline
 5 \overline{) 64}
 \end{array}$$

Ans. 591 dols. 5 reals.

5. What will 42 bbls. of white sugar come to, weighing gross 415 arobes 18 lb. tare and tret on the whole 858 lb. at 26 reals per arobe?

$$\begin{array}{r}
 \text{ar. lb.} \\
 415 \quad 18. \\
 858 \text{ lb. make} \quad 34 \quad 8. \\
 \hline
 381 \quad 10. \\
 26. \\
 \hline
 2286. \\
 762. \\
 10 \text{ lb.} = \frac{2}{3} \text{ arobe} \quad 10 \\
 \hline
 8 \overline{) 9916} \text{ reals.}
 \end{array}$$

1239 4. Ans. 1239 dols. 4 reals.

		dols. reals.
6.	125 pieces bretagnes at 26 reals.....	406 2
7.	500 do. .. do. $24\frac{1}{2}$ do.....	1531 2
8.	80 umbrellas $6\frac{1}{2}$ dollars	520 0
9.	147 arobes of butter .. 25 do. per 100 lb.	918 6
10.	2405 arobes 19lb. sugar 25 reals per arobe	7518 0
11.	1660 do. .. 12 .. do. .. 21 do. .. do. ..	4358 7
12.	16595 feet boards 40 dols. per M. ..	667 6

EAST-INDIES.

CALCUTTA.

Accounts are kept in Rupees, Annas, and Pice.

12 pice make 1 anna, 16 annas 1 rupee.

By the *bazar*, or market exchange, for June, 1797, the exchange was, viz.—

100 English guineas were equal to 956 rupees 4 annas.

100 Spanish dollars were equal to 212 rupees.

In Weights—16 chittacks make 1 seer, 40 seers 1 maud.

The factory maud is 7½ lb. English.

The bazar maud is 8½ ditto.

The imports are sold by the factory maud and current rupees.

The exports are bought by the bazar maud and sicca rupees.

100 sicca rupees are equal to 116 current rupees.

Bednah, tin plates, and hides, are sold per corgé, 20 to a corgé.

The cavid is half a yard English.

....

1. What will 3905 dry hides amount to, at 12 rupees per corgé ?

$$\begin{array}{r}
 \begin{array}{ccc} h. & r. & h. \\ 20 & : 12 & :: 3905 \\ & & 12 \\ & & \hline & & 2|0)4686|0. \\ & & \hline & & 2343 \end{array}
 \end{array}$$

Ans. 2343 rupees.

2. How much will 189 bazar mauds 31 seers 8 chittacks of sugar come to, at 6 rupees per maud ?

$$\begin{array}{r}
 \begin{array}{r} 189 \text{ } 31 \text{ } 8 \\ 6 \\ \hline 1134 \end{array} \\
 \begin{array}{r} 20 \text{ seers } \frac{1}{2} \quad 3 \\ 10 \quad \frac{1}{2} \quad 1 \quad 8 \\ 1 \quad \frac{1}{10} \quad 0 \quad 2 \quad 4 \\ 8 \text{ chit. } \frac{1}{2} \quad 0 \quad 1 \quad 2 \\ \hline 1138 \text{ } 11 \text{ } 6 \end{array}
 \end{array}$$

Ans. 1138 r. 11 a. 6 p.

B O M B A Y.

Accounts are kept in Rupees, Quarters, and Rees.

100 rees make 1 quarter ; 4 quarters 1 rupee.

218 rupees were equal to 100 Spanish dollars, in April, 1800.

The current money is in Mohurs, Rupees, and Pice.

50 pice make 1 rupee ; 15 rupees 1 mohur.

The weights are pounds, mauds, and candies ; the pound the same as English.

A Bombay maud is 28 lb.

A Surat maud is $37\frac{1}{2}$ lb.

21 Surat mauds or 784 lb. make 1 Surat candy.

Cotton is sold by the Surat candy.

Camphire and Mocha coffee are sold by the Surat maud.

Malabar pepper is sold by the Bombay candy of 588 lb.

....

In 274 bales of cotton, weighing neat 996 cwt. 2 qrs. 23 lb. how many Surat candies ?

784 lb. = 7 cwt. 7)996 2 23

142 200 two hundreds.
24 excess 12 per cent.
56 two-quarters.
23

303 Ans. 142 can. 303 lb.

.....

M A D R A S.

Accounts are kept in Pagodas, Fanams, and Cash.

80 cash make 1 fanam ; 36 fanams 1 pagoda.

The Spanish dollars were in 1798 and '99, at 165 dollars for 100 star pagodas ; making the pagoda worth 165 cents. The revenue laws of the United States reckon them at 184 cents.

The Bengal, or Sicca (new) rupee is worth 46 to 47 cents. The revenue laws of the United States value them at 50 cents.

The current exchange is 340 Sicca rupees, for 100 Star pagodas.

A Lack of rupees is 100,000.

Cowries are sea shells used as small money in India, and on the coast of Africa, to make change among the natives in the bazar, or market, and in payment to the coolies or labourers. In May, 1792, a rupee was worth 5120 cowries. The common cowries are generally at 5 to 7 rupees per Bazar maud, the better sort from 10 to 14 rupees per maud, the price varying according to the kind.

The picul is $133\frac{1}{2}$ lb. English.

100 cattas make a picul.

A maud is 25 lb. Troy, 20 mauds make 1 candy.

The excellence of their cloth is defined by the *threads* in the warp.

The duty payable at the custom-house is $2\frac{1}{2}$ per cent. outwards and inwards. This is taken on imports according to the invoice, and on exports at the actual cost at the bazar or market.

.....

B A T A V I A:

Accounts are kept in Rix Dollars and Stivers.

The rix dollar is 48 stivers.

The ducatoon is 80 ditto.

The Spanish dollar is 64 ditto; sometimes it passes at 60 stivers.

125 lb. Dutch are equal to $133\frac{1}{2}$ lb. English.

125 do. make 1 picul.

100 cattas 1 ditto.

.....

1. In 1333 rix dols. 16 stivers, how many ducatoons?

1333 16

48

10670

5333

81064000

Ans. 800 ducatoons.

EXCHANGE.

213

2. What will 127477 cattas of bar iron come to, at 9 rix dollars per picul ?

$$\begin{array}{r}
 \text{cat.} \quad \text{r.d.} \quad \text{cat.} \\
 \text{As } 100 : 9 :: 127477 \\
 \hline
 9 \\
 \hline
 11472,93 \\
 48 \\
 \hline
 744 \\
 372 \\
 \hline
 44,64
 \end{array}$$

Ans. 11472 r. dols. 44 st.

3. What will 3894 bottles of wine come to, at 36 stivers per bottle ?

$$\begin{array}{r}
 3894 \\
 \hline
 24 \text{ stiv. } \frac{1}{3} \quad 1947 \\
 12 \quad \frac{2}{3} \quad 973 \quad 24 \\
 \hline
 2920 \quad 24
 \end{array}$$

Or thus, 36 stiv. = $\frac{3}{4}$ rix dol.

$$\begin{array}{r}
 3894 \\
 3 \\
 \hline
 4)11682 \\
 \hline
 2920 \quad 24
 \end{array}$$

Ans. 2920 rix dols. 24 stivers.

4. In 31478 lb. of sugar, how many piculs ?

$$\begin{array}{r}
 125)31478(251 \\
 250 \\
 \hline
 647 \\
 625 \\
 \hline
 228 \\
 125 \\
 \hline
 103
 \end{array}$$

Ans. 251 piculs 103 lb.

5. In 50632 lb. how many piculs ?

Ans. $\frac{pic. \quad lb.}{405 \quad 7}$

6. 12648 101 23

7. What will 279 piculs 25 lb. of sugar come to, at $7\frac{1}{2}$ rix dollars per picul?

$$\begin{array}{r}
 279 \\
 7\frac{1}{2} \\
 \hline
 1953 \\
 139\ 24 \\
 25 = \frac{1}{2} \quad 1\ 24 \\
 \hline
 2094\ 00
 \end{array}$$

Ans. 2094 rix dols.

.....

CHINA.

Calculations are made in Tales, Mace, Candareens, and Cash.

10 cash make 1 candareen.

10 candareens make 1 mace.

10 mace..... make 1 tale.

The tale of China is estimated at 1 dollar 48 cents in the United States.

The Spanish dollar is current at 72 candareens.

Weights are in Tales, Piculs, and Cattas—

16 tales make 1 catta; 100 cattas 1 picul.

A picul is equal to $133\frac{1}{2}$ lb. English.

The cavid of China is $14\frac{1}{10}$ inches; it is divided into 10 parts.

....

To change pounds English to Cattas.

RULE. Deduct 25 per cent. or one quarter, for cattas.

EXAMPLE.

In 62668 lb. English, how many cattas?

$$\begin{array}{r}
 \frac{1}{4} 62668 \\
 15667
 \end{array}$$

Ans. 47001 cattas.

....

To change cattas to pounds English.

RULE. Add one third for pounds English.

EXAMPLE.

In 47001 cattas, how many lb. English?

$$\begin{array}{r}
 \frac{1}{3} 47001 \\
 15667
 \end{array}$$

Ans 62668 lb. English.

PRACTICAL QUESTIONS.

1. What is the amount of 308 chests of bohea tea, weighing neat 101956 lb. at 15 tales per picul?

$$\begin{array}{r}
 \frac{1}{4})101956 \text{ lb.} \\
 \underline{25489} \\
 \text{cat.} \quad \text{tal.} \\
 100 : 15 :: 76467 \text{ cattas.} \\
 \underline{15} \\
 382335 \\
 \underline{76467} \\
 11470,05
 \end{array}$$

Ans. 11470 tales 5 cand.

2. What will 75 chests of souchong tea come to, weighing neat 4875 lb. at 44 tales per picul?

$$\begin{array}{r}
 \frac{1}{4})4875 \\
 \underline{1218\frac{3}{4}} \\
 3656\frac{1}{4} \text{ cattas.} \\
 \underline{44} \\
 14624 \\
 \underline{14624} \\
 11
 \end{array}$$

Ans. 1608 tal. 7 ma. 5 cand.

3. How many dollars will pay for an invoice of tea, amounting to 6446 tales 1 mace 6 candareens?

$$\begin{array}{r}
 72)6446 \text{ 1 6}(8953 \\
 \underline{576} \\
 686 \\
 \underline{648} \\
 381 \\
 \underline{360} \\
 216 \\
 \underline{216}
 \end{array}$$

Ans. 8953 dols.

M A N I L A.

Accounts are kept in Dollars, Reals, and Quartos.

12 quartos make 1 real ; 8 reals 1 dollar.

The arobe is 25 lb. $5\frac{1}{2}$ arobes make 1 picul.

Their 100 lb. is equal to 104 lb. English.

....

1. What will 1897 bags of sugar amount to, weighing neat 1361 piculs 1 arobe $17\frac{1}{2}$ lb. at 6 dollars per arobe ?

$$\begin{array}{r}
 1361 \quad 1 \quad 17\frac{1}{2} \\
 \quad \quad \quad 6 \\
 \hline
 8166 \\
 \begin{array}{r}
 1 \text{ ar.} \quad \frac{1}{2} \quad 1 \quad 1\frac{1}{2} \\
 12\frac{1}{2} \text{ lb.} \quad \frac{1}{2} \quad 4\frac{3}{4} \\
 5 \quad \frac{1}{2} \quad 1\frac{3}{4} \\
 \hline
 8168 \quad 0
 \end{array}
 \end{array}$$

Ans. 8168 dollars.

2. 118 bags of sugar, weighing 89 1 22 $\frac{1}{2}$ at 5 7 Ans. 524 6
 3. 663 do.....do..... 469 3 18 .. 6 2819

.....

COLUMBO, ISLE OF CEYLON.

The money is in paper, silver, and gold.

Paper money is in the bills of the Company, and is of uncertain value.

Silver is in the rupees of different parts of India.

The Sicca rupee is worth more than any other by 7 to 8 per cent.

Gold is the Mohur pagoda.

The exchange is various, as silver is rarely seen.

6 stiversmake.... 1 shilling Flemish.
 8 shillings..... 1 rix dollar.
 30 stivers 1 rupee.
 64 $\frac{1}{2}$ do. 1 Spanish dollar.

J A P A N.

Accounts are in Tales, Mace, and Candareens.

10 candareens make 1 mace.

10 mace.....1 tale = $\frac{3}{4}$ of a dollar, or 75 cents.

Ten mace are equal to 1 rix dollar.

Six tales make a corban, a gold coin not used in accounts.

In Weights—10 tales make 1 mace; 16 mace 1 catta.

The ichan or hickey is $3\frac{1}{2}$ feet.

The balee is 65 quarts.

Thirty-five per cent. was the duty on privileged imports in 1799. It is on the exports (which are all free of duty) that the Dutch make their profit upon their return to Batavia. A privilege is granted to the captain of the Dutch ships to carry money, which often sells at an advance.

....

How much is the neat proceeds of 4 silver watches, at 35 tales each, deducting the duty of 35 per cent. ?

35 tales.	
4	
<hr/>	
140	
35 per cent.	
<hr/>	
700	Sales 140
420	Duty 49
<hr/>	
49,00	Ans. neat proceeds 91 tales.

.....

FORM OF AN ACCOUNT OF SALES.

	tales.	DUTIES. tales.	NEAT. tales.
4 silver watches, 1st kind	35	49	91
6 silver watches, 2d kind	23,1	48,5,1	90,0,9

The article is given in the first column, the price in the next column, the duties in the third, and the neat proceeds in the fourth.

PIECE GOODS.

BOMBAY.		CHINA.	
	<i>Pieces to the Ton.</i>		<i>Pieces to the Ton.</i>
Annabatches	R. 400	Nankeen cloth	R. 400
Bombay stuifs	R. 400	Silks, of all sorts	R. 800
Byrampauts	400	China ware, 50 cubical feet to the ton,	
Bejutapauts	R. 400	or about 4 chests of the usual dimensions.	
Boralchawders or brawls	1200	Other measarable goods, 50 cubical feet to the ton.	
Betellees	400		
Chelloes	R. 400		
Chintz of all sorts	R. 400		
Dooties	R. 400		
Guinea stuifs, large	600		
Ditto, small	1200		
Longcloths, whole pieces	160		
Ditto, half ditto	320		
Lemances	R. 800		
Musters	400		
Nunsarees	R. 400		
Neganepauts	400		
Niccanees, large	600		
Ditto, small	600		
Salampores	400		
Stuffs, brown	R. 400		
Tapseils, large	400		
Ditto, small	600		

N. B. Where the letter R. is set against pieces of 400 to the ton, it shews those goods are to be reduced, or brought to a standard of 16 yards long and 1 broad.

Where against pieces of 800 to the ton, to 10 yards long and 1 broad.

EXAMPLE.

1000 pieces of 12 yards long and 1 $\frac{1}{2}$ broad, at 400 to the ton, make 844 pieces, or 2 tons 44 pieces.

1000 pieces of 10 $\frac{1}{2}$ yards long and 1 $\frac{1}{2}$ broad, at 800 to the ton, is 1181 pieces, or 1 ton 381 pieces.

WEIGHABLE GOODS.

	<i>Cwt. to the Ton.</i>		<i>Cwt. to the Ton.</i>
Arrangoes	20	Gum Opoponax	16
Aloes	16	.... Sagapenum	18
Benjamin	20	.... Sarcocol	18
Borax	20	Indigo	12
Cardemons, fine goods	12	Iron Kintlage	20
Cakelack	16	Musk	20
Carmenia Wool	10	Myrrh	16
Cambogium	20	Mother-of-Pearl Shells	20
Cassia Ligneæ	8	Nux Vomita	15
Cassia Buds	12	Pepper	16
Camphire	15	Quicksilver	20
Cotton Yarn, Fine Goods	10	Rhubarb	8
Cowries Gruff ditto	20	Raw Silk	10
Coffee Fine do.	18	Ditto in chests	8
Cinnabar	10	Ditto in bales or bundles	10
Cloves	12	Redwood	20
Dragon's Blood	20	Rice	20
Gum Arabic	16	Shellack	16
.... Elemi	16	Seedlack	18
.... Ammoniacum	16	Sticklack	16

WEIGHABLE GOODS.

	<i>Cwt. to the Ton.</i>		<i>Cwt. to the Ton.</i>
Salt-Petre	20	Tea, Green.....	8
Senna.....	8	....Bohea.....	10
Sago	16	Arrack....Gauge gallons.....	251
Ditto, packed in China ware.....	—	Canes.....	Tale 300
Tutenague	20	Wanghees and Bamboes.....	3000
Turmeric	16	Rattans equal to 16 cwt.	6000
Tinca!.....	16		

.....

ARBITRATION OF EXCHANGE.

WHEN the rates of exchange between several countries in succession are given, to find the rate of exchange between the first and last place in the correspondence.

RULE. Find by proportion the value of the sum originally remitted in the different monies of the countries through which it passes according to the rates of the different exchanges and so proceed till the whole is finished. Or,

Multiply all the first terms of the different statings together for a divisor, and the second terms, together with the sum remitted, for a dividend, and the quotient is the amount received in the denomination of the last place in the correspondence: from this result the rate of exchange is readily found by proportion.

EXAMPLES.

1. A merchant in London has credit for 500 piastres in Leghorn for which he can draw directly at 52*d.* sterling per piastre, but chusing to have it remitted by a circular rout, they are sent, by his order, to Venice at 95 piastres for 100 ducats banco; from thence to Cadiz at 350 maravedies per ducat banco; from thence to Lisbon at 630 reas per piastre of 272 maravedies; from thence to Amsterdam at 48*d.* Flemish for 400 reas; from thence to Paris at 54*d.* Flemish per crown; and from thence to London at 30*d.* sterling per crown: What is the arbitrated price between London and Leghorn per piastre, and what is gained or lost by this circular remittance without reckoning expences?

<i>piast.</i>	<i>d. ban.</i>	<i>piast.</i>	<i>d. ban.</i>	
95	: 100	: 500	: 526 $\frac{6}{19}$	in Venice.
<i>d. b.</i>	<i>mar.</i>	<i>d. b.</i>	<i>mar.</i>	
1	: 350	: 526 $\frac{6}{19}$	: 184210 $\frac{19}{9}$	in Cadiz.
<i>mar.</i>	<i>reas.</i>	<i>mar.</i>	<i>reas.</i>	
272	: 630	: 184210 $\frac{19}{9}$	: 426664	in Lisbon.
<i>reas.</i>	<i>d. fl.</i>	<i>reas.</i>	<i>d. fl.</i>	
400	: 48	: 426664	: 51199 $\frac{1}{2}$	in Amsterdam.
<i>d. fl.</i>	<i>cr.</i>	<i>d. fl.</i>	<i>cr.</i>	
54	: 1	: 51199 $\frac{1}{2}$	: 948 $\frac{5}{6}$	in Paris.
<i>cr.</i>	<i>d. st.</i>	<i>cr.</i>	<i>£. s. d.</i>	
1	: 30	: 948 $\frac{5}{6}$	: 118 10 4 $\frac{1}{2}$	sterling.

Or thus,

<i>piast.</i>	<i>d. b.</i>	<i>mar.</i>	<i>reas.</i>	<i>d. fl.</i>	<i>cr.</i>
95	×	1	×	272	×
400	×	54	×	1	=
55814400					
<i>piast.</i>	<i>d. b.</i>	<i>mar.</i>	<i>reas.</i>	<i>d. fl.</i>	<i>cr. d. st.</i>
500	×	100	×	350	×
630	×	48	×	1	×
30	=	1587600000000			
12					
558144|00)	15876000000|00	) 28444½			
1116288					
—————					
4713120	2|0)237|0 4½				
—————					
4465152	£.118 10. 4½ as above,				
—————					
2479680					
2232576					
—————					
2471040					
2232576					
—————					
2384640	<i>piast.</i>	£.	<i>s.</i>	<i>d.</i>	<i>piast. d.</i>
2232576	500	: 118	10	4½	:: 1: 56½ 777.
—————					
152064					
4					
—————					
558144)	608256	(1			
558144					

2|0)237|0 4 $\frac{1}{2}$
 £.118 10.4 $\frac{1}{2}$ as above.

piast. £. s. d. *piast.* d.
 500 : 118 10 4 $\frac{1}{2}$:: 1 : 56 $\frac{1777}{1000}$

50112 £. s. d.
 Amount received by circular remittance 118 10 4 $\frac{1}{2}$
 500 piastres at 52d, 108 6 8

Ans. { Gained by circular remittance £.10 3 8 $\frac{1}{2}$
 { Arbitrated value of a piastre by ditto 56 $\frac{1777}{1000}$ d. st.

2. A merchant in Boston has £.225 sterling in London which he can draw for at 54*d.* sterling per dollar, but chusing to try a circular rout it is sent to Dublin at £.100 sterling for £.109 Irish; thence to Hamburgh at 12½ marks banco per pound Irish; thence to Amsterdam at 33 florins for 40 marks banco; thence to Copenhagen at 5 florins for 2 rix dollars of Denmark; thence to Bremen at 3 marks per rix dollar of Denmark; thence to Russia at 5 marks for 2 rubles; thence to Bordeaux at 5 francs per ruble; thence to Cadiz at 18 reals plate for 10 francs; thence to Lisbon at 1250 reals plate for 100 milreas; thence to Leghorn at 750 soldi for 88 millreas; thence to Smyrna at 2 soldi per piastre; thence to Jamaica at 24*d.* Jamaica currency per piastre; and thence to Boston at 80*d.* Jamaica currency per dollar: What is gained or lost by this circular remittance?

Ans. 117 dols. 42 cts. gained.

.....

AMERICAN DUTIES.

ARE CALCULATED AS IN THE FOLLOWING.

EXAMPLES.

1. What is the duty on 2885 gallons of molasses, at 5 cts. per gallon?

$$\begin{array}{r} 2885 \\ 5 \\ \hline \end{array}$$

14425 cents. Ans. 144 dols. 25 cts.

2. What is the duty on the above molasses, if imported in a foreign vessel, the rate being 5½ cents per gallon, or 10 per cent. more than an American vessel?

$$\begin{array}{r} 2885 \\ 5\frac{1}{2} \\ \hline 14425 \\ 1442\frac{1}{2} \\ \hline \end{array}$$

dols. 158,67½

$$\begin{array}{r} \text{Or, } 144,25 \text{ as above.} \\ 10 \text{ per cent. } 14,42\frac{1}{2} \\ \hline \text{dols. } 158,67\frac{1}{2} \end{array}$$

Ans. 158 dols. 67½ cts.

3. How much is the duty on 3720 gallons of gin, at $31\frac{2}{10}$ cents per gallon?

3720	3720
<u>$31\frac{2}{10}$</u>	<u>9</u>
3720	10)33480
11160	<u> </u>
3348	3348

dols. 1186,68 Ans. 1186 dols. 68 cents.

- | | <i>dols.</i> | <i>cts.</i> |
|---|--------------|-----------------|
| 4. 1273 lb. chocolate at 3 cents | Ans. 38 | 19 |
| 5. 965 lb. do. in a foreign vessel at $3\frac{3}{10}$ do. | 31 | $84\frac{1}{2}$ |
| 6. 1149 lb. cheese at 7 ditto | 80 | 43 |
| 7. 1295 lb. do. in a foreign vessel at $7\frac{7}{10}$ do. | 99 | $71\frac{1}{2}$ |
| 8. 1879 gals. Champaign wine at 45 do. | 845 | 55 |
| 9. 2675 do. London particular Madeira at 58 do. | 1551 | 50 |

10. What is the duty on 53 cwt. 2 qrs. 21 lb. of untarred Cordage, at 225 cents per cwt.?

	225
	<u>58</u>
	675
	1125
2 qrs.	$\frac{1}{2}$ 112 $\frac{1}{2}$
14 lb.	$\frac{1}{4}$ 28
7 do.	$\frac{1}{8}$ 14
	<u> </u>
	120,79 $\frac{1}{2}$

Ans. 120 dols. 79 $\frac{1}{2}$ cts.

11. What is the duty on the above cordage in a foreign vessel, at $247\frac{1}{2}$ cts. per cwt.?

Ans. 132 dols. 87 $\frac{1}{2}$ cts.

12. How much is the duty on 4 hhd. of brown sugar, wt. gross 38 cwt. 3 qrs. 19 lb. tare 12 lb. per 100, at $2\frac{1}{2}$ cents per lb. ?

	3800	
	456 = excess 12 per cent.	
	84	
	19	
	<hr/>	
gross	4359	4359
tare	523	12
	<hr/>	<hr/>
	3836	523,08
	2 $\frac{1}{2}$	
	<hr/>	
	7672	
	1918	
	<hr/>	
	95,90	

Ans. 95 dols. 90 cts..

13. What is the duty on this sugar, in a foreign vessel, at $2\frac{1}{2}$ cents per lb. ?

Ans. 105 dols. 49 cts..

.....

The mode of estimating ad valorem rates of duty.

The ad valorem rates of duty, upon goods, wares and merchandizes, at the place of importation, shall be estimated by adding 20 per cent. to the actual cost thereof, if imported from the Cape of Good Hope, or from any other place beyond the same, and 10 per cent. on the actual cost thereof, if imported from any other place or country, including all charges, commissions, outside packages and insurance excepted.—(*See Laws of the United States.*)

EXAMPLES.

1. What is the duty on an invoice of silver and plated ware, imported from London, the cost exclusive of commissions, &c. being £.359 18 4, at 15 per cent. ad valorem?

		359	
		444	cents per £. sterling.
		<hr/>	
		1436	
		1436	
		<hr/>	
		1436	
10s.	$\frac{1}{2}$	222	
5	$\frac{1}{2}$	111	
3 4d.	$\frac{1}{3}$	74	
		<hr/>	
actual cost		159803	cents
10 per cent. added		15980	
		<hr/>	
		175783	
		<hr/>	
10	$\frac{1}{10}$	17578	
5	$\frac{1}{2}$	8789	
		<hr/>	
for 15 per cent.		26367	cents.

Ans. 263 dols. 67 cts.

2. What will it amount to in a foreign vessel, at 16 $\frac{1}{2}$ per cent. ad valorem?

Ans. 290 dols. 4 cents.

.....

The rates at which all foreign coins and currencies are estimated at the Custom-Houses of the United States.

	Dols.	Cts.
Each pound sterling of Great Britain, at	4	44
Each pound sterling of Ireland	4	10
Each livre tournois of France.....		18 $\frac{1}{2}$
Each florin or gilder of the United Netherlands ..		40
Each mark banco of Hamburg		33 $\frac{1}{2}$
Each rix dollar of Denmark	1	
Each real of plate of Spain		10
Each real of vellon of Spain		5
Each milree of Portugal	1	24
Each tale of China	1	48
Each pagoda of India	1	84
Each rupee of Bengal		50

2. A man being asked how many sons he had, said that the youngest was 4 years old, and the eldest 32, and that he increased one in his family every 4 years, how many had he?

Ans. 8.

The second, third and fourth given to find the first.

RULE. Multiply the fourth by the third, made less by 1 the product subtracted from the second gives the first.

EXAMPLES.

1. A man in 10 days went from Boston to a certain town in the country, every day's journey increasing the former by 4 and the last day he went was 46 miles, what was the first?

Ans. 10 miles.

$4 \times 10 - 1 = 36$ then $46 - 36 = 10$, the first day's journey.

2. A man takes out of his pocket at 8 several times, so many different numbers of shillings, every one exceeding the former by 6; the last 46, what was the first?

Ans. 4.

The second, third and fifth given to find the first.

RULE. Divide the fifth by the third, and from the quotient subtract half the product of the fourth, multiplied by the third less 1, gives the first.

EXAMPLE.

A man is to receive £.360 at 12 several payments, each to exceed the former by £.4, and is willing to bestow the first payment on any one that can tell him what it is; what will that person have for his pains?

Ans. £.8.

$360 \div 12 = 30$ then $30 - \frac{4 \times 12 - 1}{2} = 8$, the first payment.

The first, third and fourth given to find the second.

RULE. Subtract the fourth from the product of the third, multiplied by the fourth, that remainder added to the first gives the second.

EXAMPLE.

What is the last number of an Arithmetical Progression, beginning at 6, and continuing by the increase of 8 to 20 places ?

Ans. 158.

$20 \times 8 = 160$ then $160 - 2 = 158$, the last number.

.....

GEOMETRICAL PROGRESSION

Is the increasing or decreasing of any rank of numbers by some common ratio, that is, by the continual multiplication or division of some equal number : As 2, 4, 8, 16, increase by the multiplier 2, and 16, 8, 4, 2 decrease by the divisor 2.

NOTE. When any number of terms is continued in Geometrical Progression, the product of the two extremes will be equal to any two means, equally distant from the extremes : As 2, 4, 8, 16, 32, 64, where $64 \times 2 = 4 \times 32 = 8 \times 16 = 128$.

When the number of terms are odd, the middle term multiplied into itself will be equal to the two extremes, or any two means, equally distant from the mean : As 2, 4, 8, 16, 32, where $2 \times 32 = 4 \times 16 = 8 \times 8 = 64$.

In Geometrical Progression the same five things are to be observed as in Arithmetical, viz.

1. The first term.
2. The last term.
3. The number of terms.
4. The equal difference or ratio.
5. The sum of all the terms.

NOTE. As the last term in a long series of numbers, is very tedious to come at, by continual multiplication ; therefore, for the readier finding it out, there is a series of numbers made use of in Arithmetical Proportion, called indices, beginning with an unit, whose common difference is one, whatever number of indices you make use of, set as many numbers (in such Geometrical Proportion as is given in the question) under them :

As 1, 2, 3, 4, 5, 6 indices.
2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

But if the first term in Geometrical Proportion be different from the ratio, the indices must begin with a cypher.

As 0, 1, 2, 3, 4, 5, 6 indices.
1, 2, 4, 8, 16, 32, 64 numbers in Geometrical Proportion.

When the indices begin with a cypher, the sum of the indices made choice of must be always one less than the number of terms given in the question, for 1 in the indices is over the second term, and 2 over the third, &c.

Add any two of the indices together, and that sum will agree with the product of their respective terms.

As in the first table of indices $2 + 5 = 7$

Geometrical proportion $4 \times 32 = 128$

Then in the second

$$2 + 4 = 6$$

$$4 \times 16 = 64$$

In any Geometrical Progression proceeding from unity, the ratio being known, to find any remote term, without producing all the intermediate terms.

RULE. Find what figures of the indices added together would give the exponent of the term wanted, then multiply the numbers standing under such exponent into each other, and it will give the term required.

NOTE. When the exponent 1 stands over the second term, the number of exponents must be 1 less than the number of terms.

EXAMPLES.

1. A man agrees for 12 peaches, to pay only the price of the first, reckoning a farthing for the first, a half-penny for the second, &c. doubling the price to the last, what must he give for them?

0, 1, 2, 3, 4, exponents.

1, 2, 4, 8, 16, number of terms.

$$16 = 4$$

$$16 = 4$$

$$256 = 8$$

$$8 = 3$$

$4 + 4 + 3 = 11$, number of terms less 1.

$$4)2048 = 11 \text{ numb. farth.}$$

$$12)512$$

$$20)428$$

$$£.2 \ 2 \ 8 \text{ answer.}$$

2. A country gentleman going to a fair to buy some oxen, meets with a person who had 23, he demanding the price of them, was answered £.16 apiece; the gentleman bids him £.15

piece, and he would buy all ; the other tells him it would not be taken, but if he would give what the last ox would come to, at a farthing for the first, and doubling it to the last, he should have all. What was the price of the oxen ?

Ans. £.4369 1s. 4d.

In any Geometrical Progression, not proceeding from unity, the ratio being given, to find any remote term, without producing all the intermediate terms.

RULE. Proceed as in the last, only observe that every product must be divided by the first term.

EXAMPLES.

1. A sum of money is to be divided among eight persons, the first to have £.20, the second £.60, and so on in triple proportion, what will the last have ?

$$\begin{array}{r} \text{O. 1. 2. 3.} \quad \frac{540 \times 540}{20} = 14580 \text{ then } \frac{14580 \times 60}{20} = 43740 \\ 20. 60. 180. 540. \end{array}$$

Ans. £.43740.

$3 + 3 + 1 = 7$ one less than the number of terms.

2. A gentleman, dying, left 9 sons, to whom and to his executor, he bequeathed his estate in manner following : To his executor £.50; his youngest son was to have as much more as the executor, and each son to exceed the next younger by as much more ; what was the eldest son's portion ?

Ans. £.25600.

The first term, ratio, and number of terms given, to find the sum of all the terms.

RULE. Find the last term as before, then subtract the first from it, and divide the remainder by the ratio less one, to the product of which add the greater, and it gives the sum required.

EXAMPLES.

1. A servant skilled in numbers agreed with a gentleman to serve him 12 months, provided he would give him a farthing

for his first month's service, a penny for the second, and 4*d.* for the third, &c.—what did his wages amount to ?

$$256 \times 256 = 65536, \text{ then } 65536 \times 64 = 4194304$$

0. 1. 2. 3. 4.	4194304—1
1. 4. 16. 64. 256.	—————=1398101; then
(4+4+3=11. No. of terms less 1.)	4—1
	1398101 + 4194304 = 5592405 farthings.
	Ans. £.5825 8 <i>s.</i> 5½ <i>d.</i>

2. A man bought a horse, and by agreement was to give a farthing for the first nail, three for the second, &c.; there were 4 shoes, and in each shoe 8 nails; what was the worth of the horse ?

$$\text{Ans. } £.965114681693. 13*s.* 4*d.*$$

3. A certain person married his daughter on new-year's day, and gave her husband one shilling towards her portion, promising to double it on the first day of every month for one year; what was her portion ?

$$\text{Ans. } £.204. 15*s.*$$

4. A laceman well versed in numbers, agreed with a gentleman to sell him 22 yards of rich gold brocaded lace, for 2 pins the first yard, 6 pins the second, &c. in triple proportion. I desire to know what he sold the lace for, if the pins were valued at 100 for a farthing; also, what the laceman got or lost by the sale thereof, supposing the lace stood him in £.7 per yard.

$$\text{Ans. The lace sold for } £.326886. 0*s.* 9*d.*$$

$$\text{Gain } £.326732. 0*s.* 9*d.*$$

.....

P E R M U T A T I O N

Is the changing or varying of the order of things.

RULE. Multiply all the given terms one into another, and the last product will be the number of changes required.

EXAMPLES.

1. How many changes may be rung upon 12 bells, and how long would they be ringing but once over, supposing 10 changes might be rung in one minute, and the year to contain 365 days 6 hours ?

$$1 \times 2 \times 3 \times 4 \times 5 \times 6 \times 7 \times 8 \times 9 \times 10 \times 11 \times 12 = 479001600.$$

changes, which $\div 10 = 47900160$ minutes, and if reduced $= 91$ years 3 weeks 5 days and 6 hours.

2. A young scholar coming into a town for the convenience of a good library, demands of a gentleman with whom he lodged, what his diet would cost for a year, who told him £.10; but the scholar, not being certain what time he should stay, asked him what he must give him for so long as he could place his family (consisting of 6 persons besides himself) in different positions, every day at dinner; the gentleman, thinking it could not be long, tells him £.5, to which the scholar agrees: what time did the scholar stay with the gentleman?

Ans. 5040 days.

.....

EXTRACTION OF THE SQUARE ROOT.

EXTRACTING THE SQUARE ROOT is to find out such a number as being multiplied into itself, the product will be equal to the given number.

RULE. 1. Point the given number, beginning at the unit's place, then to the hundred's, and so upon every second figure throughout.

2. Seek the greatest square number in the first point, towards the left hand, placing the square number under the first point, and the root thereof in the quotient; subtract the square number from the first point, and to the remainder bring down the next point and call that the resolvend.

3. Double the quotient, and place it for a divisor on the left hand of the resolvend; seek how often the divisor is contained in the resolvend (reserving always the unit's place) and put the answer in the quotient, and also on the right hand side of the divisor; then multiply by the figure last put in the quotient, and subtract the product from the resolvend; bring down the next point to the remainder (if there be any more) and proceed as before.

Roots.	1.	2.	3.	4.	5.	6.	7.	8.	9.
Squares.	1.	4.	9.	16.	25.	36.	49.	64.	81.

U 2

234 EXTRACTION OF THE SQUARE ROOT..

EXAMPLES.

1. What is the square root of 119025 ?

$$\begin{array}{r}
 119025(345 \\
 \underline{9} \\
 64)290 \\
 \underline{256} \\
 685)3425 \\
 \underline{3425}
 \end{array}$$

Ans. 345.

2. What is the square root of 106929 ? Ans. 327
 3. What is the square root of 2268741 ? Ans. 1506,23 +
 4. What is the square root of 7596796 ? Ans. 2756,228 +
 5. What is the square root of 36372961 ? Ans. 6031
 6. What is the square root of 22071204 ? Ans. 4698

When the given number consists of a whole number and decimals together, make the number of decimals even, by adding cyphers to them, so that there may be a point fall on the unit's place of the whole number.

7. What is the square root of 3271,4007 ? Ans. 57,19 +
 8. What is the square root of 4795,25731 ? Ans. 69,247 +
 9. What is the square root of 4,372594 ? Ans. 2,091 +
 10. What is the square root of 2,2710957 ? Ans. 1,50701 +
 11. What is the square root of ,00032754 ? Ans. ,01809 +
 12. What is the square root of 1,270054 ? Ans. 1,1269 +

To extract the square root of a vulgar fraction.

RULE. Reduce the fraction to its lowest terms, then extract the square root of the numerator for a new numerator, and the square root of the denominator for a new denominator.

If the fraction be a surd, (i. e.) a number whose root can never be exactly found, reduce it to a decimal, and extract the root from it.

EXAMPLES.

13. What is the square root of $\frac{3384}{1}$? Ans. $\frac{2}{3}$.
 14. What is the square root of $\frac{2194}{1}$? Ans. $\frac{4}{5}$.
 15. What is the square root of $\frac{2214}{1}$? Ans. $\frac{6}{7}$.

SURDS.

16. What is the square root of $\frac{375}{41}$? Ans. ,89802 +
 17. What is the square root of $\frac{347}{496}$? Ans. ,86602 +
 18. What is the square root of $\frac{478}{49}$? Ans. ,93308 +

To extract the square root of a mixed number:

RULE. 1. Reduce the fractional part of the mixed number to its lowest term, and then the mixed number to an improper fraction.

2. Extract the roots of the numerator and denominator for a new numerator and denominator.

If the mixed number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the square root therefrom.

EXAMPLES.

19. What is the square root of $51\frac{2}{3}$? Ans. $7\frac{1}{3}$.
 20. What is the square root of $27\frac{2}{16}$? Ans. $5\frac{1}{4}$.
 21. What is the square root of $9\frac{4}{9}$? Ans. $3\frac{1}{3}$.

SURDS.

22. What is the square root of $85\frac{1}{3}$? Ans. $9,27 +$
 23. What is the square root of $8\frac{5}{7}$? Ans. $2,9519 +$
 24. What is the square root of $6\frac{2}{3}$? Ans. $2,5298 +$

THE APPLICATION.

1. There is an army consisting of a certain number of men, who are placed rank and file, that is, in the form of a square, each side having 576 men; I desire to know how many the whole square contains? Ans. 331776.

2. A certain pavement is made exactly square, each side of which contains 97 feet, I demand how many square feet are contained therein? Ans. 9409.

To find a mean proportional between any two given numbers.

RULE. The square root of the product of the given number is the mean proportional sought.

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EXAMPLES.

1. What is the mean proportional between 3 and 12 ?
 Ans. $3 \times 12 = 36$ then $\sqrt{36} = 6$ the mean proportional;
 2. What is the mean proportional between 4276 and 842 ?
 Ans. 1897,4 +
-

To find the side of a square equal in area to any given superficies.

RULE. The square root of the content of any given superficies, is the square equal sought.

EXAMPLES.

3. If the content of a given circle be 100, what is the side of the square equal ?
 Ans. 12,64911.
 4. If the area of a circle is 750, what is the side of the square equal ?
 Ans. 27,38642.
-

The area of a circle given to find the diameter.

RULE. As 355 : 452, or as 1 : 1,275239 :: so is the area : to the square of the diameter ;—or, multiply the square root of the area by 1,12837, and the product will be the diameter.

EXAMPLES.

5. What length of cord will fit to tie to a cow's tail, the other end fixed in the ground, to let her have liberty of eating an acre of grass, and no more, supposing the cow and tail to be 5 yards and a half ?
 Ans. 6,136 perches.
-

The area of a circle given to find the periphery, or circumference.

RULE. As 113 : 1420, or as 1 : 12,56637 :: the area : to the square of the periphery, or multiply the square root of the area by 3,5449, and the product is the circumference.

EXAMPLES.

6. When the area is 12, what is the circumference?
Ans. 12,2798.

7. When the area is 160, what is the periphery?
Ans. 44,84.

....

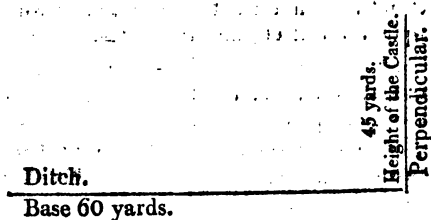
Any two sides of a right angled triangle given to find the third side.

1. The base and perpendicular given to find the hypothenuse.

RULE. The square root of the sum of the squares of the base and perpendicular is the length of the hypothenuse.

EXAMPLES.

8. The top of a castle from the ground is 45 yards high, and is surrounded with a ditch 60 yards broad; what length must a ladder be to reach from the outside of the ditch to the top of the castle?
Ans. 75 yards.



9. The wall of a town is 25 feet high, which is surrounded by a moat of 30 feet in breadth, I desire to know the length of a ladder that will reach from the outside of the moat to the top of the wall.
Ans. 39,05 feet.

....

The hypothenuse and perpendicular given to find the base.

RULE. The square root of the difference of the squares of the hypothenuse and perpendicular is the length of the base.

The base and hypotenuse given to find the perpendicular.

RULE. The square root of the difference of the hypotenuse and base is the height of the perpendicular.

N. B. The two last questions may be varied for examples to the two last propositions.

....

Any number of men being given to form them into a square battle, or to find the number of ranks and files.

RULE. The square root of the number of men given, is the number of men either in rank or file.

10. An army consisting of 331776 men, I desire to know how many in rank and file? Ans. 576.

11. A certain square pavement contains 48841 square stones, all of the same size, I demand how many are contained in one of the sides. Ans. 221.

.....

EXTRACTION OF THE CUBE ROOT.

To extract the Cube Root is to find out a number which being multiplied into itself, and then into that product, produceth the given number.

RULE 1. Point every third figure of the cube given, beginning at the unit's place, seek the greatest cube to the first point and subtract it therefrom, put the root in the quotient, and bring down the figures in the next point to the remainder for a resolvend.

2. Find a divisor by multiplying the square of the quotient by 3. See how often it is contained in the resolvend, rejecting the units and tens, and put the answer in the quotient.

3. To find the *subtrahend*. 1. Cube the last figure in the quotient. 2. Multiply all the figures in the quotient by 3, except the last, and that product by the square of the last. 3. Multiply the divisor by the last figure. Add these products together, gives the *subtrahend*, which subtract from the resolvend; to the remainder bring down the next point and proceed as before.

Roots.	1.	2.	3.	4.	5.	6.	7.	8.	9.
Cubes.	1.	8.	27.	64.	125.	216.	343.	512.	729.

EXAMPLE.

What is the cube root of 99252847 ?

$$\begin{array}{r} 99252847(463 \\ 64 = \text{Cube of } 4. \end{array}$$

Divisor. ———

Square of $4 \times 3 = 48$) 35252 Resolvend

$$\begin{array}{r} 216 = \text{Cube of } 6 \\ 432 = 4 \times 3 \times \text{by square of } 6 \\ 288 = \text{Divisor} \times \text{by } 6 \\ \hline 33336 \text{ Subtrahend} \end{array}$$

Divisor. ———

Sq. of $46 \times 3 = 6348$) 1916847 Resolvend

$$\begin{array}{r} 27 = \text{Cube of } 3 \\ 1242 = 46 \times 3 \times \text{by square of } 3 \\ 19044 = \text{Divisor} \times \text{by } 3 \\ \hline 1916847 \text{ Subtrahend.} \end{array}$$

....

Another new and more concise method of extracting the Cube Root.

RULE. 1. Point every third figure of the cube given, beginning at the unit's place, then find the nearest cube to the first point, and subtract it therefrom, put the root in the quotient, bring down the figures in the next point to the remainder for a resolvend.

2. Square the quotient and triple the square for a divisor—as, $4 \times 4 \times 3 = 48$. Find how often it is contained in the resolvend, rejecting units and tens, and put the answer in the quotient.

3. Square the last figure in the quotient, and put it on the right hand of the divisor :

As $6 \times 6 = 36$ put to the divisor $48 = 4836$,

4. Triple the last figure in the quotient, and multiply by the former, put it under the other, units under the tens, add them together, and multiply the sum by the last figure in the quotient, subtract that product from the resolvend, bring down the next point and proceed as before,

CUBE ROOT.

EXAMPLES.

1. What is the cube root of 99252847 ?

Square of 4 $\times 3 = 48$ divisor	99252847 (463
Square of 6 put to 48 $= 4836$	64
$6 \times 3 \times 4 = 72$	35252
$5556 \times 6 =$	33336
Square of 46 $= 2116 \times 3 = 6348$ divisor	1916847
Square of 3 $= 9$ put to 6348 $= 634809$	
$3 \times 3 \times 46 = 414$	
	638949 $\times 3 = 1916847$

- | | |
|---|------------|
| 2. What is the cube root of 389017 ? | Ans. 73. |
| 3. What is the cube root of 5735339 ? | Ans. 179. |
| 4. What is the cube root of 32461759 ? | Ans. 319. |
| 5. What is the cube root of 84604519 ? | Ans. 439. |
| 6. What is the cube root of 259694072 ? | Ans. 638. |
| 7. What is the cube root of 48228544 ? | Ans. 364. |
| 8. What is the cube root of 27054036008 ? | Ans. 3002. |
| 9. What is the cube root of 22069810125 ? | Ans. 2805. |
| 10. What is the cube root of 122615327232 ? | Ans. 4968. |
| 11. What is the cube root of 219365327791 ? | Ans. 6031. |
| 12. What is the cube root of 673373097125 ? | Ans. 8765. |

When the given number consists of a whole number and decimal together, make the number of decimals to consist of 3, 6, 9, &c. places, by adding cyphers thereto, so that there may be a point fall on the unit's place of the whole number.

- | | |
|---|--------------|
| 13. What is the cube root of 12,977875 ? | Ans. 2,35 |
| 14. What is the cube root of 36155,027576 ? | Ans. 33,06 + |
| 15. What is the cube root of ,001906624 ? | Ans. ,124 |
| 16. What is the cube root of 33,230979637 ? | Ans. 3,215 + |
| 17. What is the cube root of 15926,972504 ? | Ans. 25,16 + |
| 18. What is the cube root of ,053258279 ? | Ans. ,376 + |

.....

* When the quotient is 1, 2, or 3, there must be a cypher put to supply the place of tens.

To extract the cube root of a vulgar fraction.

RULE. Reduce the fraction to its lowest terms, then extract the cube root of the numerator and denominator for a new numerator and denominator; but if the fraction be a surd, reduce it to a decimal, and then extract the root from it.

EXAMPLES.

- | | |
|--|----------------------|
| 19. What is the cube root of $\frac{240}{680}$? | Ans. $\frac{5}{7}$. |
| 20. What is the cube root of $\frac{324}{1500}$? | Ans. $\frac{3}{5}$. |
| 21. What is the cube root of $\frac{1580}{5130}$? | Ans. $\frac{2}{3}$. |

SURDS.

- | | |
|--|------------|
| 22. What is the cube root of $\frac{4}{9}$? | Ans. ,829+ |
| 23. What is the cube root of $\frac{5}{9}$? | Ans. ,822+ |
| 24. What is the cube root of $\frac{2}{3}$? | Ans. ,873+ |

To extract the cube root of a mixed number.

RULE. Reduce the fractional part to its lowest terms, and then the mixed number to an improper fraction, extract the cube roots of the numerator and denominator for a new numerator and denominator; but if the mixed number given be a surd, reduce the fractional part to a decimal, annex it to the whole number, and extract the root therefrom.

EXAMPLES.

- | | |
|--|-----------------------|
| 25. What is the cube root of $12\frac{1}{2}$? | Ans. $2\frac{1}{2}$. |
| 26. What is the cube root of $31\frac{15}{43}$? | Ans. $3\frac{1}{2}$. |
| 27. What is the cube root of $405\frac{28}{125}$? | Ans. $7\frac{2}{5}$. |

SURDS.

- | | |
|---|-------------|
| 28. What is the cube root of $7\frac{1}{2}$? | Ans. 1,93+ |
| 29. What is the cube root of $9\frac{1}{8}$? | Ans. 2,092+ |
| 30. What is the cube root of $8\frac{1}{2}$? | Ans. 2,057+ |

THE APPLICATION.

1. If a cubical piece of timber be 47 inches long, 47 inches broad, and 47 inches deep, how many cubical inches doth it contain?

Ans. 103823.

2. There is a cellar dug that is 12 feet every way, in length, breadth, and depth, how many solid feet of earth were taken out of it?

Ans. 1728.

3. There is a stone of a cubic form, which contains 389017 solid feet, what is the superficial content of one of its sides ?

Ans. 5329.

Between two numbers given, to find two mean proportionals.

RULE. Divide the greater extreme by the lesser, and the cube root of the quotient multiplied by the lesser extreme gives the lesser mean; multiply the said cube root by the lesser mean, and the product will be the greater mean proportional.

EXAMPLES.

4. What are the two mean proportionals between 6 and 162 ?

Ans. 18 and 54.

5. What are the two mean proportionals between 4 and 108 ?

Ans. 12 and 36.

To find the side of a cube that shall be equal in solidity to any given solid, as a globe, cylinder, prism, cone, &c.

RULE. The cube root of the solid content of any solid body given is the side of the cube of equal solidity.

EXAMPLE.

6. If the solid content of a globe is 10648, what is the side of a cube of equal solidity ?

Ans. 22.

The side of the cube being given, to find the side of that cube, that shall be double, treble, &c. in quantity to the given cube.

RULE. Cube the side given, and multiply it by 2, 3, &c. the cube root of the product is the side sought.

EXAMPLE.

7. There is a cubical vessel, whose side is 12 inches, and it is required to find the side of another vessel that is to contain three times as much ?

Ans. 17,306.

EXTRACTION OF THE BIQUADRATE ROOT.

To extract the Biquadrate Root is to find out a number, which being involved four times into itself, will produce the given number.

RULE. First extract the square root of the given number, then extract the square root of that square root, and it will give the biquadrate root required.

EXAMPLES.

- | | |
|--|--------------|
| 1. What is the biquadrate of 27 ? | Ans. 531441. |
| 2. What is the biquadrate of 76 ? | 33362176. |
| 3. What is the biquadrate of 275 ? | 5719140625. |
| 4. What is the biquadrate root of 531441 ? | 27. |
| 5. What is the biquadrate root of 33362176 ? | 76. |
| 6. What is the biquadrate root of 5719140625 ? | 275. |

.....

A GENERAL RULE**FOR EXTRACTING THE ROOTS OF ALL POWERS.**

1. **PREPARE** the number given for extraction, by pointing off from the unit's place, as the root required directs.

2. Find the first figure in the root, by the table of powers, which subtract from the given number.

3. Bring down the first figure in the next point to the remainder, and call it the dividend.

4. Involve the root into the next inferior power to that which is given; multiply it by the given power, and call it the divisor.

5. Find a quotient figure by common division, and annex it to the root; then involve the whole root into the given power, and call that the subtrahend.

6. Subtract that number from as many points of the given power as is brought down, beginning at the lowest place, and to the remainder bring down the first figure of the next point for a new dividend.

7. Find a new divisor, and proceed in all respects as before.

RULE FOR EXTRACTING, &c.

EXAMPLES.

1. What is the square root of 141376 ?

$$\begin{array}{r}
 141376(376 \\
 \underline{9} \\
 6)51 \text{ dividend} \\
 \underline{1369} \text{ subtrahend} \\
 74) 447 \text{ dividend} \\
 \underline{141376} \text{ subtrahend}
 \end{array}
 \qquad
 \begin{array}{l}
 5 \times 2 = 10 \text{ divisor} \\
 37 \times 37 = 1369 \text{ subtrahend} \\
 57 \times 2 = 114 \text{ divisor} \\
 376 \times 376 = 141376 \text{ subtrahend}
 \end{array}
 \qquad
 \text{Ans. } 376.$$

2. What is the cube root of 53157376 ?

$$\begin{array}{r}
 53157376(376 \\
 \underline{27} \\
 27)261 \text{ dividend} \\
 \underline{50653} \text{ subtrahend} \\
 4107)25043 \text{ dividend} \\
 \underline{53157376} \text{ subtrahend}
 \end{array}
 \qquad
 \begin{array}{l}
 3 \times 3 \times 3 = 27 \text{ divisor} \\
 37 \times 37 \times 37 = 50653 \text{ subtrahend} \\
 37 \times 37 \times 3 = 4107 \text{ divisor} \\
 376 \times 376 \times 376 = 53157376 \text{ subtrahend}
 \end{array}
 \qquad
 \text{Ans. } 376.$$

3. What is the biquadrate root of 19987173376 ?

$$\begin{array}{r}
 19987173376(376 \\
 \underline{81} \\
 108)1188 \text{ dividend} \\
 \underline{1874161} \text{ subtrahend} \\
 202612) 1245563 \text{ dividend} \\
 \underline{19987173376} \text{ subtrahend}
 \end{array}
 \qquad
 \begin{array}{l}
 3 \times 3 \times 3 \times 3 = 81 \text{ divisor} \\
 37 \times 37 \times 37 \times 37 = 1874161 \text{ subtrahend} \\
 37 \times 37 \times 37 \times 3 = 202612 \text{ divisor} \\
 376 \times 376 \times 376 \times 376 = 19987173376 \text{ subtrahend}
 \end{array}
 \qquad
 \text{Ans. } 376.$$

DUODECIMALS.

DUODECIMALS, or Cross Multiplication, is a rule made use of in measuring and computing the dimensions of the several parts of buildings; it is likewise used to find ships' tonnage and the contents of bales, cases, &c.

Dimensions are taken in feet, inches, and parts.

Artificers' work is computed by different measures, viz.
 Glazing, and masons' flat work, by the foot ;
 Painting, paving, plastering, &c. by the yard.
 Partitioning, flooring, roofing, tiling, &c. by the square of 100 ft.
 Brick-work, &c. by the rod of $16\frac{1}{2}$ feet, whose square is 272 $\frac{1}{4}$.

The contents of bales, cases, &c. by the ton of 40 cubic feet.
 The tonnage of ships, by the ton of 95 feet.

....

RULE FOR MULTIPLYING DUODECIMALLY.

1. Under the multiplicand write the corresponding denominations of the multiplier.

2. Multiply each term in the multiplicand, (beginning at the lowest) by the feet in the multiplier ; write each result under each respective term, observing to carry an unit from each lower denomination to its superior.

3. In the same manner, multiply the multiplicand by the inches in the multiplier, and write the result of each term, one place more to the right hand of them, in the multiplicand.

4. Work in the same manner with the other parts in the multiplier, setting the result of each term two places to the right hand of those in the multiplicand, and so on for thirds, fourths, &c.

5. Proceed in the like manner with all the rest of the denominations, and their sum will give the answer required.

DUODECIMALS.

EXAMPLES.

1. Multiply 4 feet 9 inches by 8 inches.

$$\begin{array}{r}
 4 \text{ ft. } 9 \text{ in.} \\
 \times 8 \text{ in.} \\
 \hline
 3 \text{ ft. } 2 \text{ in.}
 \end{array}$$

Ans. 3 feet 2 inches.

2. Multiply 9 feet 6 inches by 4 feet 9 inches.

	<i>ft.</i>	<i>in.</i>	
	9	6	
	4	9	
<i>ft. in.</i>			
9 ft 6 in \times 4 feet =	38	0	
9 ft 6 in \times 9 in. =	7	1 6	
	45	1 6	

Ans. 45 feet 1 inch and 6 twelfths.

3. What is the price of a marble slab, whose length is 5 feet 7 inches, and breadth 1 foot 10 inches, at 1 dollar per foot?

Ans. 10 dols. 23 cents.

4. There is a house with three tiers of windows, 3 in a tier, the height of the first tier is 7 feet 10 inches, of the second 6 feet 8 inches, and of the third 5 feet 4 inches, and the breadth of each is 3 feet 11 inches; what will the glazing come to, at 14d. per foot?

Ans. £.13 11s. 10½d.

5. If a house measures within the walls 52 feet 8 inches in length, and 30 feet 6 inches in breadth, and the roof be of a true pitch or the rafters
- $\frac{3}{4}$
- of the breadth of the building, what will it come to roofing at 10s. 6d. per square?

Ans. £.12 12s. 11½d.

APPLICATION OF DUODECIMALS.

To find how many cubic or solid square feet (in order to ascertain the freight) are contained in cases, bales, &c. that is, how many cubic feet they will take up in a ship.

EXAMPLES.

1. Suppose the dimensions of a bale to be 7 feet 6 inches, feet 3 inches, and 1 foot 10 inches; what is the solid content?

	ft.	in.	
	7	6	
	3	3	
ft. in.	<hr/>		
7	6 × 3 ft. =	22	6
7	6 × 3 in. =	1	10 6
		<hr/>	
		24	4 6
		1	10
ft. in. tw.	<hr/>		
24	4 6 × 1 ft. =	24	4 6
24	4 6 × 10 in. =	20	3 9
		<hr/>	
		44	8 3

Ans. 44 feet 8 inches and 3 twelfth parts.

2. What is the freight of a bale containing 65 feet 9 inches, at 15 dollars per ton of 40 feet?

dols. cts.		decimally.
15,00 for 40 feet.		65,75
20 ft.	$\frac{1}{2}$ 7,50	<hr/> 15
5 ft.	$\frac{1}{4}$ 1,87,5	<hr/> 32875
6 in.	$\frac{1}{10}$,18,7	<hr/> 6575
3	$\frac{1}{2}$,09,3	<hr/> 40)986,25
	<hr/> 24,65,5	<hr/> 24,65,6

Ans. 24 dols. 65 $\frac{1}{2}$ cts.

3. A merchant imports from London 6 bales of the following dimensions, viz.

No.	Length.		Height.	Depth.
	ft.	in.	ft.	in.
1.	2	10	2	9
2.	2	10	2	6
3.	3	6	2	2
4.	2	10	2	8
5.	2	10	2	6
6.	2	11	2	8

What are the solid contents, and how much will the freight amount to, at 20 dollars per ton?

The contents are, viz.		ft.	in.	Feet.
No. 1.		11	7	71,58
2.		8	10	
3.		12	7	20 dols. per ton.
4.		13	2	
5.		12	5	40)1431,60
6.		13	0	
		<hr/>		<hr/>
		71	7	35,79

Ans. 35 dols. 79 cts.

.....

To find Ships' Tonnage by Carpenters' Measure.

RULE. For single-decked vessels, multiply the length, breadth at the main beam, and depth of the hold together, and divide the product by 95.

EXAMPLE.

What is the tonnage of a single decked vessel, whose length is 60 feet, breadth 20 feet, and depth 8 feet.

$$\begin{array}{r}
 60 \text{ length} \\
 20 \text{ breadth} \\
 \hline
 1200 \\
 8 \text{ depth} \\
 \hline
 95 \overline{)9600} (101 \frac{5}{95} \\
 \underline{95} \\
 100 \\
 \underline{95} \\
 5.
 \end{array}$$

Ans. $101 \frac{5}{95}$ tons.

This is the usual method of tonnage of a single-decked vessel, having the deck bolted to the wale. But if it be required that the deck be bolted at any height above the wale, the custom is to pay the carpenter for one half of the additional height, to which the deck may be thus raised; that is, one half of the difference being added to the former depth gives the depth to be used in calculating the tonnage.

EXAMPLE.

A merchant, after having contracted with a carpenter to build a single-decked vessel of 60 feet keel, 20 feet beam, and 8 feet hold, desires that the deck be laid for 10 feet hold; required the tonnage to be paid for?

$$\begin{array}{r}
 60 \text{ length} \\
 20 \text{ breadth} \\
 \hline
 1200 \\
 1 = \frac{1}{2} \text{ diff. of depth} + 8 = 9 \\
 \hline
 95)10800(113\frac{1}{2} \\
 \underline{95} \\
 130 \\
 \underline{95} \\
 350 \\
 \underline{285} \\
 65
 \end{array}$$

Ans. $113\frac{1}{2}$ tons.

.....

RULE. For a double-decked vessel, take half the breadth of the main beam for the depth of the hold, and work as for a single-decked vessel.

EXAMPLES.

1. What is the tonnage of a double-decked vessel, whose length is 65 feet, and breadth 21 feet 6 inches?

$$\begin{array}{r}
 65 \text{ length} \\
 21 \text{ 6 breadth} \\
 \hline
 65 \\
 130 \\
 65 \text{ ft.} \times 6 \text{ in.} = \underline{32 \text{ 6}} \\
 1397 \text{ 6} \\
 \text{ft. in.} \quad \quad \quad 10 \text{ 9 depth} \\
 1397 \text{ 6} \times 10 \text{ ft.} = \underline{13975 \text{ 0}} \\
 1397 \text{ 6} \times 9 \text{ in.} = \underline{1048 \text{ 1}} \\
 95)15023 \text{ 1}(158\frac{1}{2} \\
 \underline{95} \\
 552 \\
 \underline{475} \\
 773 \\
 \underline{760} \\
 13
 \end{array}$$

Ans. $158\frac{1}{2}$ tons.

The preceding question may be wrought thus :

$$\begin{array}{r}
 65 \\
 21\ 6 \\
 \hline
 65 \\
 130 \\
 \hline
 6\ \frac{1}{2} \quad 1365 \\
 \quad \quad 32\ 6 \\
 \hline
 \quad \quad 1397\ 6 \\
 \quad \quad \quad 10\ 9 \\
 \hline
 \quad \quad 13975\ 0 \\
 6\ \frac{1}{2} \quad 698\ 9 \\
 3\ \frac{1}{2} \quad 349\ 4 \\
 \hline
 95)15023\ 1 \text{ as before.} \\
 \hline
 158\frac{1}{2}\frac{1}{2} \text{ tons.}
 \end{array}$$

2. What will the above tonnage amount to, at 16 dols. per ton ?

$ \begin{array}{r} 158 \\ 16 \\ \hline 948 \\ 158 \\ \quad 2,18 \\ \hline 2530,18 \\ \hline \end{array} $	$ \begin{array}{r} \text{dols.} \\ 16 \\ 13 \\ \hline 48 \\ 16 \\ \hline 95)208(2,18 \\ \quad 190 \\ \hline \quad 180 \\ \quad \quad 95 \\ \hline \quad \quad 850 \\ \quad \quad 760 \\ \hline \quad \quad 90 \end{array} $
<p>Ans. 2530 dols. 18 cents.</p>	

3. Required the tonnage of a ship of 74 feet keel, and 26 ft 6 inches beam ?

Ans. $273\frac{1}{2}\frac{1}{2}$ tons.

To find the Government Tonnage.

"If the vessel be double-decked, take the length thereof from the fore part of the main stem, to the after part of the stern post, above the upper deck; the breadth thereof at the broadest part above the main wales, half of which breadth shall be accounted the depth of such vessel, and then deduct from the length, three-fifths of the breadth, multiply the remainder by the breadth, and the product by the depth, and divide this last product by 95, the quotient whereof shall be deemed the true contents or tonnage of such ship or vessel; and if such ship or vessel be single-decked, take the length and breadth, as above directed, deduct from the said length three-fifths of the breadth, and take the depth from the under side of the deck plank, to the ceiling in the hold, then multiply and divide as aforesaid, and the quotient shall be deemed the tonnage."

EXAMPLES.

1. What is the government tonnage of a single-decked vessel, whose length is 69 feet 6 inches, breadth 22 feet 6 inches, and depth 8 feet 6 inches?

	<i>ft. in.</i>	
	69 6 length.	22 6 breadth
deduct	13 6 for $\frac{3}{5}$ breadth.	3
	<hr/>	<hr/>
	56 0	5)67 6
	22 6 breadth	<hr/>
	<hr/>	13 6
	112 0	
	112	
6 in. $\frac{1}{2}$	28 0	
	<hr/>	
	1260 0	
	8 6 depth	
	<hr/>	
	10080 0	
6 in. $\frac{1}{2}$	630 0	
	<hr/>	
	95)10710 0(112 $\frac{7}{9}$ tons.	
	95	
	<hr/>	
	121	
	95	
	<hr/>	
	260	
	190	
	<hr/>	
	70	

Ans. 112 $\frac{7}{9}$ tons.

2. What is the government tonnage of a double-decked vessel, of the following dimensions, length 75 feet 6 inches, breadth 23 feet 4 inches, and depth 11 feet 8 inches?

$ \begin{array}{r} \text{ft. in.} \\ 75 \ 6 \\ 14 \ 0 \text{ for } \frac{2}{3} \text{ breadth} \\ \hline 61 \ 6 \\ 23 \ 4 \text{ breadth} \\ \hline 183 \\ 122 \\ 6 \text{ in. } \frac{1}{2} \quad 11 \ 6 \\ 4 \text{ in. } \frac{1}{3} \quad 20 \ 6 \\ \hline 1435 \ 0 \\ 11 \ 8 \text{ depth} \\ \hline 15785 \ 0 \\ 6 \text{ in. } \frac{1}{2} \quad 717 \ 6 \\ 2 \text{ in. } \frac{1}{3} \quad 239 \ 2 \\ \hline 95)16741 \ 8(176\frac{2}{3}\frac{1}{3} \text{ tons.} \\ \underline{95} \\ 724 \\ \underline{665} \\ 591 \\ \underline{570} \\ 21 \end{array} $	$ \begin{array}{r} \text{ft. in.} \\ 75 \ 6 \\ 14 \ 0 \\ \hline 61 \ 6 \\ 23 \ 4 \\ \hline 61 \text{ ft.} \times 23 \text{ ft.} = 1403 \ 0 \\ 6 \text{ in.} \times 23 \text{ ft.} = 11 \ 6 \\ 61 \text{ ft.} \times 4 \text{ in.} = 20 \ 6 \\ \hline 1435 \ 0 \\ 11 \ 8 \\ \hline 15785 \\ 1435 \text{ ft.} \times 8 \text{ in.} = 956 \ 6 \\ \hline 16741 \ 8 \text{ as before.} \end{array} $
---	--

Ans. $176\frac{2}{3}\frac{1}{3}$ tons.

3. What is the government tonnage of a double-decked vessel, of the following dimensions, length 82 feet 3 inches, breadth 24 feet 3 inches, and depth 12 feet $1\frac{1}{2}$ inches?

Ans. $209\frac{6}{3}\frac{3}{3}$ tons.

TABLES OF CORDAGE.

A CORDAGE TABLE, shewing how many fathoms, feet, and inches of a rope, of any size, not more than 14 inches, make a hundred weight ; with the use of the table.

Inches.	Fathoms. Feet. Inches.	Inches.	Fathoms. Feet. Inches.	Inches.	Fathoms. Feet. Inches.	Inches.	Fathoms. Feet. Inches.
1	486 0 0	4½	26 5 3	7½	8 4 0	10½	4 1 8
1¼	313 3 0	4¾	24 0 0	7¾	8 3 6	11	4 0 3
1½	216 3 0	4¾	21 3 0	8	7 3 6	11½	3 5 7
1¾	159 3 0	5	19 3 0	8½	7 0 8	11¾	3 4 1
2	124 3 0	5½	17 4 0	8¾	6 4 3	11¾	3 3 3
2¼	96 2 0	5½	16 1 0	8¾	6 2 1	12	3 2 3
2½	77 3 0	5¾	14 4 6	9	6 0 0	12½	3 2 1
2¾	65 4 0	6	13 3 0	9½	5 4 0	12½	3 2 0
3	54 0 0	6½	12 2 0	9½	5 2 0	12¾	2 7 8
3¼	45 5 2	6½	11 3 0	9¾	5 0 6	13	2 5 3
3½	39 3 0	6¾	10 4 0	10	4 5 0	13½	2 4 9
3¾	34 3 9	7	9 5 6	10½	4 4 1	13½	2 4 0
4	30 1 6	7½	9 1 6	10½	4 2 2	14	2 3 6
						14	2 2 1

USE OF THE TABLE.

At the top of the table, marked inches, fathoms, feet, inches, the first column is the thickness of the rope in inches and quarters, and the other three the fathoms, feet, and inches that make up a hundred weight of such a rope. One example will make it plain :

Suppose you desire to know how much of a seven-inch rope will make a hundred weight : Find 7 in the third column under inches, or thickness of rope, and against it in the fourth column you find 9 5 6, which shews that there will be 9 fathoms 5 feet 6 inches required to make one hundred weight.

TABLES OF CORDAGE.

A TABLE, shewing the weight of any Cable or Rope of 120 fathoms in length, and for every half inch, from 3 to 24 inches in circumference.

Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.	Inches.	Cwt.	Qrs.
3	2	1	7	12	1	11	30	1	15½	60	0
3½	3	0	7½	14	0	11½	33	0	16	64	0
4	4	0	8	16	0	12	36	0	16½	68	0
4½	5	0	8½	18	0	12½	39	0	17	72	1
5	6	1	9	20	1	13	42	1	17½	76	2
5½	7	2	9½	22	2	13½	45	2	18	81	0
6	9	0	10	25	0	14	49	0	18½	85	2
6½	10	2	10½	27	2	14½	52	2	19	90	1
						15	56	1	19½	95	0
									20	100	0
									20½	105	0
									21	110	1
									21½	115	2
									22	121	0
									22½	126	2
									23	132	1
									23½	138	0
									24	144	0

USE OF THE TABLE.

The first column marked for inches, is the thickness or circumference of the cable to every half inch from 3 to 24 inches; the second, marked Cwt. qrs. for the hundred weights and quarters that it will weigh if 120 fathoms in length.

For instance: Suppose it be a cable of 14½ inches; look against 14½ and you will find in the other column 52 cwt. 2 qrs. which shews that 120 fathoms of 14½ inch cable will weigh 52 cwt. 2 qrs. and so in others: and any quantity of a less length will weigh in proportion.

....

A ship was brought to anchor in a gale of wind, but the gale increasing, it was thought safest to cut the cables, in consequence of which 75 fathoms of 16 inches and 50 fathoms of 12 inches were lost; what must they be valued at in calculating the average; new cordage being then 14 dollars per cwt.?

CALCULATION.

120 fath. 16 in. cable = 64 cwt.

120 fath. 12 in. cab. = 36 cwt.

60 do. 32

40 do. 12

15 do. 8

10 do. 3

75 fath. weighing .. 40

50 fath. weighing .. 15

50 do. 15

dols. cts.

55 cwt. at 14 dols. per cwt. 770 00

One third deducted for new 256 66⅔

Answer—dols. 513 33⅓

A T A B L E

For receiving and paying the Gold Coins of France and Spain, at 100 cents for $27\frac{2}{3}$ grains according to Act of Congress.

				137ths							137ths							137ths				
grains.	dol.	cts.	of a ct.	dwt.	dol.	cts.	of a ct.	ounees.	dol.	cts.	of a ct.	ounees.	dol.	cts.	of a ct.	ounees.	dol.	cts.	of a ct.			
1	..	0	3	89	12	..	10 51 13	27	..	472	99	37	28	..	490	51	13	29	..	508	2	126
2	..	0	7	41	13	..	11 38 94	28	..	490	51	13	29	..	508	2	126	30	..	525	54	102
3	..	0	10	130	14	..	12 26 38	29	..	508	2	126	30	..	525	54	102	31	..	543	6	78
4	..	0	14	82	15	..	13 13 119	30	..	525	54	102	31	..	543	6	78	32	..	560	58	54
5	..	0	18	34	16	..	14 1 63	31	..	543	6	78	32	..	560	58	54	33	..	578	10	30
6	..	0	21	123	17	..	14 89 7	32	..	560	58	54	33	..	578	10	30	34	..	595	62	6
7	..	0	25	75	18	..	15 76 88	33	..	578	10	30	34	..	595	62	6	35	..	613	13	119
8	..	0	29	27	19	..	16 60 32	34	..	595	62	6	35	..	613	13	119	36	..	630	65	95
9	..	0	32	116	20	..	17 51 113	35	..	613	13	119	36	..	630	65	95	37	..	648	17	71
10	..	0	36	68	ounees.			37	..	648	17	71	38	..	665	69	47	38	..	665	69	47
11	..	0	40	20	1	..	17 51 113	38	..	665	69	47	39	..	683	21	23	39	..	683	21	23
12	..	0	43	109	2	..	35 3 89	39	..	683	21	23	40	..	700	72	136	40	..	700	72	136
13	..	0	47	61	3	..	52 55 65	40	..	700	72	136	41	..	718	24	112	41	..	718	24	112
14	..	0	51	13	4	..	70 7 41	41	..	718	24	112	42	..	735	76	88	42	..	735	76	88
15	..	0	54	102	5	..	87 59 17	42	..	735	76	88	43	..	753	28	64	43	..	753	28	64
16	..	0	58	54	6	..	105 10 130	43	..	753	28	64	44	..	770	80	40	44	..	770	80	40
17	..	0	62	6	7	..	122 62 106	44	..	770	80	40	45	..	788	32	16	45	..	788	32	16
18	..	0	65	95	8	..	140 14 82	45	..	788	32	16	46	..	805	83	129	46	..	805	83	129
19	..	0	69	47	9	..	157 66 58	46	..	805	83	129	47	..	823	35	105	47	..	823	35	105
20	..	0	72	136	10	..	175 18 34	47	..	823	35	105	48	..	840	87	81	48	..	840	87	81
21	..	0	76	88	11	..	192 70 10	48	..	840	87	81	49	..	858	39	57	49	..	858	39	57
22	..	0	80	40	12	..	210 21 123	49	..	858	39	57	50	..	875	91	33	50	..	875	91	33
23	..	0	83	129	13	..	227 73 99	50	..	875	91	33	51	..	893	43	9	51	..	893	43	9
24	..	0	87	81	14	..	245 25 75	51	..	893	43	9	52	..	910	94	122	52	..	910	94	122
dwt.					15	..	262 77 51	52	..	910	94	122	53	..	928	46	98	53	..	928	46	98
1	..	0	87	81	16	..	280 29 27	53	..	928	46	98	54	..	945	98	74	54	..	945	98	74
2	..	1	75	25	17	..	297 81 3	54	..	945	98	74	55	..	963	50	50	55	..	963	50	50
3	..	2	62	106	18	..	315 32 116	55	..	963	50	50	56	..	981	2	26	56	..	981	2	26
4	..	3	50	80	19	..	332 84 92	56	..	981	2	26	57	..	998	54	2	57	..	998	54	2
5	..	4	37	131	20	..	350 36 68	57	..	998	54	2	58	..	1016	55	115	58	..	1016	55	115
6	..	5	25	75	21	..	367 88 44	58	..	1016	55	115	59	..	1033	57	91	59	..	1033	57	91
7	..	6	13	19	22	..	385 40 20	59	..	1033	57	91	60	..	1051	9	67	60	..	1051	9	67
8	..	7	0	100	23	..	402 91 131	60	..	1051	9	67	61	..	1068	61	43	61	..	1068	61	43
9	..	7	88	44	24	..	420 43 109	61	..	1068	61	43	62	..	1086	13	19	62	..	1086	13	19
10	..	8	75	125	25	..	437 95 85	62	..	1086	13	19										
11	..	9	63	69	26	..	455 47 61															

TABLES OF GOLD COIN.

A T A B L E

For receiving and paying the Gold Coins of Great-Britain and Portugal, at
100 cents for 27 grains, according to Act of Congress.

27ths			9ths			9ths		
grs.	dol.	cts. of act.	dwt.	dol.	cts. of act.	oz.	dol.	cts. of act.
1 ..	0	3 19	12 ..	10	66 6	28 ..	497	77 7
2 ..	0	7 11	13 ..	11	55 5	29 ..	515	55 5
3 ..	0	11 3	14 ..	12	44 4	30 ..	533	33 3
4 ..	0	14 22	15 ..	13	33 3	31 ..	551	11 1
5 ..	0	18 14	16 ..	14	22 2	32 ..	568	88 8
6 ..	0	22 6	17 ..	15	11 1	33 ..	586	66 6
7 ..	0	25 25	18 ..	16	00 0	34 ..	604	44 4
8 ..	0	29 17	19 ..	16	88 8	35 ..	622	22 2
9 ..	0	33 9	20 ..	17	77 7	36 ..	640	00 0
10 ..	0	37 1	ounces.			37 ..	657	77 7
11 ..	0	40 20	1 ..	17	77 7	38 ..	675	55 5
12 ..	0	44 12	2 ..	35	55 5	39 ..	693	33 3
13 ..	0	48 4	3 ..	53	33 3	40 ..	711	11 1
14 ..	0	51 23	4 ..	71	11 1	41 ..	728	88 8
15 ..	0	55 15	5 ..	88	88 8	42 ..	746	66 6
16 ..	0	59 7	6 ..	106	66 6	43 ..	764	44 4
17 ..	0	62 26	7 ..	124	44 4	44 ..	782	22 2
18 ..	0	66 18	8 ..	142	22 2	45 ..	800	00 0
19 ..	0	70 10	9 ..	160	00 0	46 ..	817	77 7
20 ..	0	74 2	10 ..	177	77 7	47 ..	835	55 5
21 ..	0	77 21	11 ..	195	55 5	48 ..	853	33 3
22 ..	0	81 13	12 ..	213	33 3	49 ..	871	11 1
23 ..	0	85 5	13 ..	231	11 1	50 ..	888	88 8
24 ..	0	88 24	14 ..	248	88 8	51 ..	906	66 6
			15 ..	266	66 6	52 ..	924	44 4
			16 ..	284	44 4	53 ..	942	22 2
			17 ..	302	22 2	54 ..	960	00 0
			18 ..	320	00 0	55 ..	977	77 7
			19 ..	337	77 7	56 ..	995	55 5
			20 ..	355	55 5	57 ..	1013	33 3
			21 ..	373	33 3	58 ..	1031	11 1
			22 ..	391	11 1	59 ..	1048	88 8
			23 ..	408	88 8	60 ..	1066	66 6
			24 ..	426	66 6	61 ..	1084	44 4
			25 ..	444	44 4	62 ..	1102	22 2
			26 ..	462	22 2	63 ..	1120	00 0
			27 ..	480	00 0	64 ..	1137	77 7

MERCANTILE PRECEDENTS:

.....

BILL OF EXCHANGE.

Newburyport, Feb. 12, 1804.

EXCHANGE for £.1000 sterling.

At twenty days sight of this my first of exchange (second and third of the same tenor and date not paid) pay to John Parker, or order, One Thousand Pounds Sterling, with or without further advice from

Your humble servant,
WILLIAM PRINCE.

Messrs. DUTTON & GREEN,
Merchants,
London.

.....

BILL OF GOODS,

At an advance on the sterling cost.

Boston, May 5, 1804.

Mr. WILLIAM POOLE,

Bought of SIMON SIMMONDS,

32 ells modé	1s. 8d. sterl.	£.2'13	4
64 yds. striped Nankins	1s. 6d.	4	16 0
28 .. striped calico	1s. 9d.	2	9 0
4 pieces russel	24s.	4	16 0

Sterl. 14 14 4

Exchange 33½ per cent. 4 18 1½

£.19 12 5½

Advance at 20 per cent. 3 18 5½

£.23 10 11

Dollars 78,48

Received his note at 2 months,

SIMON SIMMONDS.

1. 2.

PROMISSORY NOTE.

Boston, May 5, 1804. For value received, I promise to pay to Simon Simmonds, or order, seventy-eight dollars forty-eight cents, on demand, with interest after two months.

Attest,
SAUL JAMES.

WILLIAM POOLE.

.....

A RECEIPT FOR AN ENDORSEMENT ON A NOTE.

Boston, July 12, 1804. Received from Mr. William Poole, (by the hands of Mr. Benjamin Flint,) Thirty-eight dollars seventy cents, which is endorsed on his note of May 5, 1804..

SIMON SIMMONDS.

38 dols. 70 cts.

.....

RECEIPT FOR MONEY RECEIVED ON ACCOUNT.

Boston, January 10, 1804. Received from Mr. D. Evans, (by the hands of Mr. Thomas Dunmore,) Four hundred and thirty dollars on account.

430 dols.

GEORGE PACE.

.....

PROMISSORY NOTE BY TWO PERSONS.

Newburyport, 12th July, 1804. For value received we jointly and severally promise to pay to Mr. Samuel Rich, or order, Five hundred dollars fifty-four cents, on demand, with interest.

Attest,
WILLIAM BOLTON.

NATHAN SAYBORN.
STEPHEN NEEDY.

.....

GENERAL RECEIPT.

New-Bedford, March 27, 1804. Received from Mr. N. B. the sum of ten dollars twenty-nine cents in full of all demands.

10 dols. 29 cts.

E. D.

INVOICES.

INVOICE of 20 hhds. clayed sugar and 10 hhds. coffee, shipped by of Boston, in the United States of America, on his own account and risque, on board the ship, A. B. master, bound for and a market, consigned to the said A. B. for sales and returns, viz.

20 hhds. clayed sugar, viz.

B. C.	No. 1.	C. q. lb.	No. 1.	C. q. lb.
No. 1. a 20	No. 1.	11 3 14	11.	12 0 14
	2.	10 3 21	12.	10 2 14
	3.	11 0 0	13.	10 2 21
	4.	12 1 0	14.	11 3 21
	5.	11 1 14	15.	10 1 14
	6.	10 3 7	16.	10 2 0
	7.	10 2 0	17.	11 2 21
	8.	11 0 7	18.	10 1 14
	9.	11 0 21	19.	11 1 7
	10.	10 0 7	20.	10 3 14
		<hr/>		<hr/>
		111 0 7		110 2 0
		110 2 0		
		<hr/>		
		221 2 7		

Tare 12 per cwt. 23 2 27

197 3 8 neat, at 10 dols. 25 cts. dols. cts. 2027 67

10 hhds. coffee, wt. viz.

B. C.	No.	C. q. lb.	Tare.	No.	C. q. lb.	Tare.
No. 1. a 10	1.	9 2 7	108	6.	6 1 14	79
	2.	9 3 0	113	7.	6 1 6	61
	3.	10 1 21	106	8.	8 2 4	84
	4.	10 2 14	103	9.	9 1 8	91
	5.	8 0 14	94	10.	10 0 14	108
		<hr/>	<hr/>		<hr/>	<hr/>
		48 2 0	523		40 2 18	423
		40 2 18	423			
		<hr/>	<hr/>			
		89 0 18	9986 lb.			
		deduct tare	946			
		<hr/>	<hr/>			

9040 lb. neat at 21 cts. 1898 40

3926 07

Premium of insuring 4176 dols. 67 cts. at 6 per cent. }
to cover the amount }

250 60

Dols. 4176 67

Boston, &c.

INVOICE.

INVOICE of merchandize on board the brig Swan, A. B. master, shipped by A. M. on his own account and risque, for the West-Indies, and consigned to said master for sales and returns, viz.

140 M. of boards and plank, dol.	10 dols.	1400
20 M. of white-oak hhd. staves	30	600
12 M. of red-oak hhd. do.	12	144
130 M. shingles	3	390
B. No. 1--18. 18 hhds. of cod-fish, 17303 lb.	4 pr. C.	692 12
B. No. 1--52. 52 bbls. of beef	12	624
E. No. 1--30. 30 bbls. of salmon	10	300
F. No. 1---2. 2 bbls. pork	18	36
L. No. 1----7. 7 casks of rice, neat, 39 C.		
3 qrs. 21 lb.	4pr.cwt.	159 75
3 M. of hoops	25	75
1300 pair of shoes	50 cts.	650
		<hr/>
		Dols. 5070 87

Portsmouth, Sept. 7, 1804.

Errors excepted.

A. M.

Mr. Abraham Jones, to Walter Brown

Dr.

1804.

Jan. 5.	For 1 barrel of flour	Dols.	10
8.	4 lb. coffee	2s.	.... 1 33
9.	9 lb. of sugar	11d.	.... 1 37
23.	7 gallons of molasses	3s. 9d.	.... 4 37
Feb. 7.	3 quintals of fish	15s.	.... 7 50
16.	2 lb. hyson tea	8s. 6d.	.... 2 83
Mar. 29.	5 lb. chocolate	1s. 6d.	.... 1 25
May 5.	2 bushels of corn	4s. 9d.	.... 1 58
			<hr/>
			Dols. 30 23

Errors excepted.

ACCOUNTS OF SALES.

SALES of 20 hhds. 7 bbls. and 31 bags coffee, for and on risk of Mr. William Stillman, merchant in Portland.

1804.

March 15	William Edes, 20 hhds. wt. } 14376 lb. at 23 cts. per lb. }	Dols. 3306 48
16	George Watts, 7 bbls. wt. 1493 at 23 cts.	343 39
17	Peter Bates, 31 bags, 5507 23	1206 61

Charges, 4916 48

Advertising.....Dol. 1 46

Storage 3 50

Commission on 4916 dols. 48 cts. at 2½

per cent. 122 91 127 87

Net proceeds passed to his credit Dols. 4788 61

Errors excepted, &c.

SALES of sundry merchandize received per the ship Juno, Capt. Dane, from Macbias, and disposed of for account and risk of Amos Goodwin, merchant there.

Date.	To whom sold	quintals fish	barrels oil	barrels salm.	barrels herring	cords wood	cords bark	feet boards	barrels beef	Price	Amount
1804.										dls. cts.	dols. cts.
June 4	James Yates	30								3	90
8	Wm. Rowe	12								3 27	292 40
27	John Payson		6							12	72
July 4	James Nugent						22			4	88
	Cash			50						8 75	437 50
8	Sim. Sands							3,216		6 50	20 90
21	Stock								15	9	135
29	Paul Simson					13				3 50	45 50
Aug. 5	Jona. Rose							1,259		6	7 55
	Taken to fill up		1								
		150	7	50		15	22	4,475	15		1288 85

Remaining unsold, 40 barrels of herring.

Charges, viz.

Storage of fish Dols. 10 50

Commission on 1288 dols. 85 cts. at 2½ per cent. 32 22 42 72

Net proceeds carried to the credit of his account, Dols. 1246 13

Errors excepted, &c.

SALES of 19 hogsheads and 7 barrels of rum, received per the schooner Ruby, Richard Butler, master, from Portsmouth, for account and risk of Daniel Edwards, merchant there.

Date.	To whom sold.	19 hhds. Rum.	7 bbls. Rum.	Gallons.	Price.	Contents.	Amount.
1804.					Cts.		dols. cts.
May 24	By Walter King	1		29½	100		29 50
June 2	By David Jones	2		216	100	110 and 106	216
20	By James Ray	4		438	96	108, 110, 111, 109	420 48
24	By Aaron Judson	3		81	95	26½, 27½, 27	76 95
July 23	By Tho's Ropes	1		115	95½		109 82
Aug. 3	By Parsons & Ely	1		25	95½		23 87
23	By Simon Sands	2		222	98	109, 113	217 56
Sept. 4	By Miles Young	1	1	138	96	110, 28	132 48
10	By Moses Bliss	5	1	342½	99	107, 104, 103, 28½	339 7
25	By Amos Dundas	6		632	98½	109, 102, 106 } 111, 112, 92 }	622 52
		19	7	2239			2188 25

Charges.

	dls. cts.	dls. cts.
Paid Capt. Butler freight of 19 hhds. rum, at	2 50	47 50
ditto ... 7 bbls.	66	4 62
Porterage 19 hhds.	40	7 60
ditto 7 bbls.	10	70
Gauging 25 casks	12½	3 25
Cooperage 3 dols. on hhds. 1 dol. 50 cts. on bbls.		4 50
Advertising		1 25
Commission on 2188 dols. 25 cts. at 5 per cent.		109 41
		178 83

Net proceeds..Dols. 2009 42

Outstanding in hands of

	dls. cts.
Moses Bliss	339 7
Amos Dundas	622 52

Boston, 25th September, 1804.

Errors excepted, &c.

SALES of the ship Hiram's Cargo, by William Sutton.

1804.	lb.	liv.	sol.	den.	liv.	sol.	den.
May 24. 65 hhd. fish, wt. nt. 72587 at 33 liv. per 100,	23953	14	2				
6 do. do. 6515 32	2084	16	0				
2 do. do. 2136 31	662	3	2				
34 do. do. 36658 30	10997	8	0				
2 do. partly dam. 2184 sold at auction for 226	0	0					
					37924	1	4

109

	liv.	sol.	den.				
24 bbls. beef, at 101 1 3 per bbl.	2425	10	0				
7 do. do. 99 8 5	695	18	11				
29 do. do. 90 15 0	2631	15	0				
4 do. do. 83 0 0	332	0	0				
					6085	3	11

64

	liv.	sol.					
13 bbls. pork	136	0	0	1768	0	0	
25 do. porter	80	0	0	2000	0	0	
3 box. lin. con. 169 piec. 96 0 pr. pie.	16224	0	0				
14 fir. butter, wt. 1129 lb. 2 5 pr. lb.	2540	5	0				
5 thousand hoops 240 pr. M.	1200	0	0				
59 do. shingles 16 do.	944	0	0				
15949 feet boards	120	do.	1913	17	7		
170 shaken hhd. 8½ pr. hhd.	1402	10	0				
					27992	12	7

	liv.	s.	d.				
Commission on 72001 17 10 at 5 per cent.	3600	1	10				

Liv. 68401 16 0

Errors excepted, &c.

Disbursements, Duties, &c. paid on ship Hiram, by Wm. Sutton.

1804.	liv.	s.	d.	liv.	s.	d.
May 18. Paid for a barrel of flour	86	10	0			
.... to the admiralty	240	11	6			
.... for fresh meat	56	12	5			
.... for flats to unload with	341	13	6			
				725	7	5
Paid to the harbour master	66	10	4			
.... for storage and negro hire	619	14	8			
.... for inward duties	714	11	7			
.... for outward duties	229	13	5			
				1630	10	0
Paid for brokerage	821	13	6			
.... for passport and certificate	68	19	7			
				890	13	1

Point-Petre, Guadaloupe, July 12, 1804.

Liv. 3246 10 6

Errors excepted, &c.

Wm. SUTTON.

<i>Mr. John Johnson in account current with William Roberts.</i>		Cr.
Dr.	dols. cts.	dols. cts.
1803.		
May 19. To cash advanced per receipt	300	
June 5. To sundries per bill	458 12	
July 25. To payment of his order to M. B. for	100	
29. To 1 bag coffee 96 lb. at 20 cents	19 20	
Aug. 1. To cash per receipt	450	
— To 5 hhds. rum 555 gals. at 83½ cents	462 50	
— To 3 boxes glass 7 by 9, 10 dols.	30	
Sept. 2. To sundries per bill	228 56	
— To cash per receipt	385	
20. To 12 bl. flour at 8 dols. 4 bl. pork at 12 ..	144	
25. To 1 bhd. sugar 8 cwt. 2 qrs. 7 lb. nt. 10 dols.	85 62	
Oct. 29. To cash and sundries in full	81	
	dols. 2744	dols. 2744
Salcm, October 28, 1803. Errors Excepted. WILLIAM ROBERTS.		

<i>Dr.</i>		<i>Mess. Wilson & Gale in account current with William Duncan.</i>		<i>Cr.</i>
1804.		dols. cts. 1804.		dols. cts.
May 19.	To 1 barrel flour delivered Wilson	9	50	Sept. 10. By amount of their account for repairs on the ship America }
28.	To cash	28	50	
June 22.	To 15 lb. butter 15s. tea 6s. Wilson	3	50	
29.	To 3 quintals scale fish, at 15s. Gale	7	50	
July 2.	To 1 half barrel flour do.	5		
15.	To 12 lb. coffee 18s. 28 lb. sugar 25s. 6d. do.	7	25	
20.	To cash	25		
26.	To 15 bushels corn at 5s. Gale	12	50	
Aug. 2.	To 8 do. rye at 6s. Wilson	8		
	To paid their order to James Rowe	12	50	
		dols. 119	25	dols. 119 25

Newburyport, 27th. Sept. 1804.

Errors excepted.

For Mr. WILLIAM DUNCAN.

SAMUEL TRUSTY.

Dr.	Mr. James Richardson, in account current with Thomas Seccome.	dols. cts. 1803.	Cr.
1803.			dols. cts.
June 12.	To sundries per bill	28 26	Oct. 12. By schooner William for blacksmith's work per bill, viz. 6325 lb. at 6 c. } 379 50
	To 53 bars Iron, wt. 21 2 10 for schooner William		759 lb. tare at 12 — per ct. 7084 lb. suppli- — ed per Dr,
July 15.	To 121 do. 41 2 18 do. do.		
26.	To 1 hhd. W.I. Rum qt. 107 gals. at 96 cts.	102 72	
Aug. 28.	To Cash per receipt.	180 00	
29.	To 4 bbls. flour at 9 dols. 50 cts.	38 00	
Sept. 21.	To cash paid his order to James Wise. . .	28 00	
	To cash in full	2 52	
		<hr/>	<hr/>
		dols. 379 50	dols. 379 50

NOTE. When a person is furnished with his account current, it is necessary to specify the various charges, and when they are numerous, some accountants make but one charge of them, in the account current, referring to an annexed account of the several articles thus included.

Newburyport, 12th October, 1803.
Errors excepted.

THOMAS SECCOME.

BILL OF SALE.

TO all people to whom this present Bill of Sale shall come, I R. P. of Newburyport, in the State of Massachusetts, Merchant, send Greeting ; KNOW YE, That I the said R. P. for and in consideration of the sum of three thousand, two hundred and twenty-two dollars, to me in hand well and truly paid at or before the ensembling and delivery of these presents, by S. T. of the said Newburyport, Merchant, the receipt whereof I do hereby acknowledge and am therewith fully and entirely satisfied and contented, have granted, bargained and sold, and by these presents do grant, bargain and sell, unto the said S. T. all the hull or body of the good brig Sally, together with all and singular her masts, spars, sails, rigging, cables, anchors, boats and appurtenances, now lying at Newburyport, and registered at the port of Newburyport, the certificate of whose registry is as follows :

IN pursuance of an Act of the Congress of the United States of America, entitled, " An ACT concerning the registering and recording of ships or vessels," R. P. of Newburyport, in the State of Massachusetts, Merchant, having taken or subscribed the oath required by the said act, and having sworn that he is the only owner of the ship or vessel called the Sally, of Newburyport, whereof William Knapp is at present master, and is a citizen of the United States, as he hath sworn, and that the said ship or vessel was built at Salisbury, in the said state, in the year seventeen hundred and ninety-nine, as also appears by a certificate of enrolment, No. 129, issued in this district on the fourth day of August last, now surrendered,—and N. S. surveyor of this district, having certified that the said ship or vessel has one deck and two masts, and that her length is sixty-nine feet five inches, her breadth twenty-two feet and one half inch, her depth eight feet two inches, and that she measures one hundred and sixty tons and forty ninety-fifths, that she is a square sterned brig, has no galleries and no figure head, and the said R. P. having agreed to the description and admeasurement above specified, and sufficient security having been given according to the said act, the said brig has been duly registered at the port of Newburyport.

Given under my hand and seal at the port of Newburyport, this first day of January, in the year one thousand eight hundred.

To have and to hold the said granted and bargained brig Sally and premises with the appurtenances, unto the said S. T. his heirs, executors, administrators or assigns to his only proper use, benefit and behoof forever. And I the said R. P. do avouch myself to be the true and lawful owner of the said brig and appurtenances, and have in myself full power, good right and lawful authority to dispose of the said brig as aforesaid, and her appurtenances in manner as aforesaid, and furthermore I the said R. P. do hereby covenant and agree to warrant and defend the said brig and premises, with the appurtenances against the lawful claims and demands of all persons whatsoever unto the said S. T. In witness whereof, I the said R. P. have hereunto set my hand and seal, this tenth day of June, in the year of our Lord one thousand eight hundred.

*Dr.**Mr. Thomas Gibson in interest*

	<i>dol. cts.</i>		<i>days. dol. ct.</i>
To Int. on	35 00	fr. Jan. 31, '96 to Oct. 12, '96,	256 1 47
To do. on	2962 19	.. Feb. 2....to...do.....	254 123 68
To do. on	2590 42	.. May 31....to...do.....	134 57 06
To do. on	1733 97	.. July 2....to...do.....	102 29 07
To do. on	73 63	.. July 12....to...do.....	92 1 11
To do. on	455 52	.. Aug. 25....to...do.....	47 3 51
To do. on	158 71	.. Sep. 30....to...do.....	12 0 31
			<u>dols. 216 21</u>

*Dr.**Mr. William Mace in interest*

	<i>dols. cts.</i>	<i>y.</i>	<i>m. d.</i>	<i>dols. cts.</i>
1798.				
March 3. To Interest on	3869	20	for 1 5 11.....	335 97
April 26.....on	273	6	.. 1 3 18.....	21 29
Aug. 18.....on	400	..	11 26.....	23 73
Dec. 28.....on	414	6	.. 7 16.....	15 59
'99 Ja. 15.....on	200	..	7 9.....	7 30
Feb. 19.....on	300	..	5 25.....	8 75
Mar. 26.....on	1300	..	4 18.....	29 90
			<u>dols. 442 58</u>	

Account with Thomas Merchant

Cr.

	dols. cts.	days.	dols.ct..
By interest on 500 from Apr. 24, '96, to Oct. 12, '96,	171	14	5
By do. 1133 25 25 12, ..	170	31	67
By do. 296 24 May 3 12, ..	162	7	88
By do. 215 5 12, ..	160	5	65
By do. 215 80 June 9 12, ..	125	4	43
By do. 109 74 24 12, ..	110	2	0
By do. 517 90 July 20 12, ..	84	7	15
Balance due on this account carried to the debit of ac't..	148	38	
	dols.	216	21

Salem, &c.

account with Thomas Merchant

Cr.

1799.	dols. cts.	dols.cts.
Jan. 16. By interest on	339 67	
	427 81	
	Y. m. d.	
	767 48 — 6 18	25 32
Balance carried to account current	417	21
	dols.	442 53

Salem, August 26th, 1799.

Errors excepted,

THOMAS MERCHANT.

CHARTER-PARTY.

THIS Charter-party of affreightment, indented, made and fully concluded upon this ninth day of June, in the year of our Lord, one thousand eight hundred, between J. P. of Boston, in the county of Suffolk, and Commonwealth of Massachusetts, merchant, owner of the good ship Helen, of the burden of two hundred tons, or thereabouts, now lying in the harbour of Boston, whereof R. P. is at present master, on the one part, and C. D. of said Boston, merchant, on the other part, *Witnesseth*, That the said J. P. for the consideration hereafter mentioned, hath letten to freight the aforesaid ship, with the appurtenances to her belonging, for a voyage to be made by the said ship to London, where she is to be discharged (the danger of the seas excepted) and the said J. P. doth by these presents covenant and agree with the said C. D. in manner following, *That is to say*, That the said ship in and during the voyage aforesaid, shall be tight, staunch and strong, and sufficiently tackled and apparelled with all things necessary for such a vessel and voyage; and that it shall and may be lawful for the said C. D. his agents or factors, as well at London as at Boston, to load and put on board the said ship, loading of such goods and merchandize as they shall think proper, contraband goods excepted.

IN consideration whereof, the said C. D. doth by these presents, agree with the said J. P. well and truly to pay, or cause to be paid, unto him, in full for the freight or hire of said ship and appurtenances, the sum of three dollars per ton, per calendar month, and so in proportion for a less time, as the said ship shall be continued in the aforesaid service, in sixty days after her return to Boston. And the said C. D. doth agree to pay the charge of victualing and manning said ship and all port charges and pilotage during said voyage, and to deliver the said ship on her return to Boston, to the owner aforesaid or his order. And to the true and faithful of all and singular the covenants, payments and agreements aforementioned, each of the parties aforementioned binds and obliges himself, his executors and administrators, in the penal sum of two thousand dollars firmly by these presents. In witness whereof, the parties aforesaid have hereunto interchangeably set their hands and seals the day and year afore-written.

BILL OF LADING.

J. R.
1 a 53
Casks Potash.
ton wt.
8 18 l. s. d.
at 80s.—35 12 0
Primage 5
pr. ct. 1 15 7

£.37 7 7

SHIPPED in good order and well conditioned by John Rolly, in and upon the good ship called the Iris, whereof is master for this present voyage Charles Ely, and now riding at anchor in the harbour of Newport, and bound for Liverpool, to say, *fifty three casks of pot ash, containing eight tons and eighteen cwt.* being marked and numbered as in the margin, and are to be delivered in the like good order and well conditioned, at the aforesaid port of Liverpool (the danger of the seas excepted) unto Mr. J. May or to his assigns, they paying freight for the said goods, *four pounds* British sterling per ton, with five per cent. primage. In witness whereof, the master or purser of the said ship hath affirmed to three bills of lading all of this tenor and date, the one of which being accomplished, the other two to stand void. Dated in Newport, July 7th, 1804.

C. ELY.

PALERMO IN SICILY.

Accounts are kept in Onges, Tarins and Grains.

20 Grainsmake..... 1 Tarin.

30 Tarins# 1 Onge or Once.

Feb. 3, 1803, the value of the money of Palermo in U. S. currency was as follows :

1 Grainequal to..... 4 Mills.
 20 do. = 1 Tarin=..... 8 Cents.
 240 do. = 12 do. = 1 Sc. dollar ..=.. 96 do.
 600 do. = 30 do. = $2\frac{1}{2}$ do. = 1 Onge = 240 do.

The Spanish dollar is current at 252 grains. The value of the onge at par is 11s. 3d. sterling. The exchange on London Feb. 3, 1803, was 56 tarins for the £. sterling, or 10s. $8\frac{1}{2}$ d. sterling per onge.

The Cantar of Sicily = 176 lb. Avoirdupois.

The Rottoli = $1\frac{1}{2}$ lb. do.

100 Rottoli make a Cantar.

A Cantar of Oil is 25 gallons English measure. The Sicilian barrel contains 9 gallons.

Mahogany is sold by weight ; one foot board measure will weigh about 2 rottoli.

The measure called Caffis is $3\frac{1}{2}$ gallons.

The lb. in Sicily is 12 oz. avoirdupois.

The Salm is 485 lb. avoirdupois.

.....

EXAMPLES.

1. What cost 264 Cantars 25 rottoli of Mahogany at 8 onges 15 tarins per cantar ?

	264
	8
	—
	2112
15 tar. $\frac{1}{2}$ =	132
25 rot. $\frac{1}{4}$ =	2 3 15
	—
	2246 3 15

Ans. 2246 ong. 3 tar. 15 gr.

2. A cargo consisting of 3564 quintals of Fish invoiced at 5 dols. 50 cts. per quintal, is sold in Palermo at 75 per cent. advance; what sum must be received for it at 252 grains per dollar?

$$\begin{array}{r}
 3564 \\
 5 \\
 \hline
 17820 \\
 50 \text{ cts. } \frac{1}{2} = 1782 \\
 \hline
 19602 \\
 50 \text{ per ct. } \frac{1}{2} = 9801 \\
 25 \dots\dots \frac{1}{4} = 4900 \text{ } 50 \\
 \hline
 \text{dols. } 34303 \text{ } 50 \\
 252 \\
 \hline
 68606 \\
 171515 \\
 68606 \\
 50 \text{ cts. } \frac{1}{2} = 126 \\
 \hline
 2|0)864448|2 \text{ grains.} \\
 \hline
 3|0)43222|4 \text{ } 2 \\
 \hline
 14407 \text{ } 14 \text{ } 2
 \end{array}$$

Ans. 14407 ong. 14 tar. 2 gr.

3. What is the Brokerage on 13131 ong. 12 tar. at $1\frac{1}{3}$ per cent?

$$\begin{array}{r}
 13131 \text{ } 12 \\
 1 \\
 \hline
 13131 \text{ } 12 \\
 \frac{1}{3} = 1641 \text{ } 12 \text{ } 15 \\
 \hline
 147|72 \text{ } 24 \text{ } 15 \\
 30 \\
 \hline
 21|84 \\
 20 \\
 \hline
 16|95
 \end{array}$$

Ans. 147 ong. 21 tar. 16 gr.

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Sept. 1802.

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
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